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SOME OBSERVATIONS ON MIDWIFERY FROM THE PUBLIC HEALTH VIEWPOINT.[1]

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IN presenting this paper I desire in the first place to express my appreciation of the privilege of having been invited to do so by your Section. The invitation was accepted, not because I thought I might be able to give any opinion worthy of the consideration of obstetric experts, but merely in the hope that certain observations may prove of interest and may add in some small measure to our knowledge of some of the factors underlying the problem of maternal mortality. Midwifery has only recently come within the purview of public health, but its special problems are very insistently demanding solution.

If we look back over history, we find that most public health problems have been extremely difficult to solve because their underlying causes have been not only medical, but also social and economic. History shows, however, that some explanation on the principle of cause and effect has always been promulgated and if possible a scapegoat, individual or collective, has generally been found. If several persons died from an obscure cause, some unfortunate individual was accused of witchcraft. If large numbers died from an epidemic of plague, the cause was found in the sin of the whole community.

In regard to the special problem under consideration the same tendency can be discerned. A short time ago the cause was "Sarah Gamp." With her

[1] Read at a meeting of the Section of Obstetrics and Gynæcology of the New South Wales Branch of the British Medical Association on June 18, 1930.

partial or complete elimination the medical profession as a whole and, to a slighter extent, the nursing profession, have been substituted as the *bête noir*. Granting for the moment that the medical profession carries a large responsibility in this matter, we must be careful not to lose sight of many important subsidiary factors and thus magnify a partial truth into the whole truth.

Until we have detailed information concerning all aspects of a problem, it is extremely dangerous to make deductions from the available evidence. The collection of data, however, is a slow process and it is much more satisfying to some minds to aggrandize an apparent truth into a solution of a problem than to adopt the attitude of suspended judgement. Hence we have two contradictory slogans—better training of the medical student and, having trained him, his elimination as a general practitioner from midwifery—which are thought to embody the principal solution of an outstanding problem. Undoubtedly thorough training of the student is essential, but the most effective training that can be imagined, cannot give an individual that indispensable attribute, common sense, which will enable him to carry his knowledge into efficient practice.

I hope to indicate later that fatal mistakes in obstetric management are generally not due to the ignorance of the practitioner concerned, but to his flouting fundamental principles which are impressed upon the student from his first acquaintance with the subject and must therefore be well recognized by the practitioner. An individual may possess extensive commercial knowledge and yet be a poor administrator in business. Similarly a medical student may be able to satisfy his examiners in every way and yet be lacking in sound judgement when administering his knowledge in the face of an urgent obstetric complication. Many other factors tend to obscure the judgement of an otherwise sound practitioner who, seeing a fellow practitioner apparently able to enhance his reputation by some ill-advised procedure, is apt to throw discretion to the winds and follow an obstetric will-o'-the-wisp.

The problem of maternal mortality is summed up annually in statistical tables which express it as a rate of so many deaths per thousand live births.

This appears to be quite a fair, scientific method, especially since the classification intended to be followed has been adopted by most countries in the world. In the compilation of statistics the human element cannot be eliminated and this makes the difficulty of obtaining strictly comparable statistics from different countries very great.

As you know, my colleague, Dr. Elma Sandford-Morgan, and myself have been for some time investigating each maternal death which occurs in New South Wales. Each such death is, in due course, discussed with an officer of the Government Statistician's Department prior to its ultimate classification. This has been very interesting and instructive and I should like to draw your attention to some of the high lights of this experience.

TABLE I.

Deaths Incidental to Child-birth in New South Wales, 1923–27, and Years 1928 and 1929.

Cause	Deaths, 1923–27.		Deaths, 1928.		Deaths, 1929.	
	Number.	Rate per 1,000 Births.	Number.	Rate per 1,000 Births.	Number.	Rate per 1,000 Births.
Accidents of pregnancy..	163	0·61	32	0·58	29	0·55
Puerperal hæmorrhage..	170	0·63	49	0·90	34	0·65
Puerperal septicæmia ..			63	1·15	49	0·93
Puerperal septicæmia following abortion ..	406	1·51				
Miscarriage			39	0·71	30	0·57
Albuminuria and eclampsia	321	1·19	67	1·22	48	0·91
Phlegmasia alba dolens, embolus, sudden death	114	0·42	25	0·46	26	0·49
Other casualties of childbirth	162	0·60	20	0·37	29	0·55
TOTAL	1,336	4·96	295	5·39	245	4·65
Illegal operations ..	191	0·71	32	0·58	33	0·63
GRAND TOTAL..	1,527	5·67	327	5·97	278	5·28

1. Many medical practitioners do not appear to be conversant with the distinction between primary and secondary causes of death. They appear to think that the symptom or pathological condition which is the latest to supervene, is the primary cause of death. For example, in *post partum* hæmorrhage followed some days later by heart failure, the primary cause is certified as heart failure, whereas for statistical purposes the hæmorrhage is the primary cause. "By 'primary cause of death' is meant (in the case of deaths from disease) the disease present at the time of death which initiated the train of events leading thereto, and not a mere secondary, contributory or immediate cause or a terminal condition or mode of death." ("Suggestions to medical practitioners by the Registrar-General of England and Wales.")

2. The fact that the puerperal state has been associated with the death of the patient is frequently not mentioned. One death, for example, was certified as "paralytic ileus after operation" and but for the fact that the death occurred in a woman of child-bearing age and was therefore suspect, no further investigation would have been undertaken to show that the operation was Cæsarean section.

3. On the other hand, there have been several deaths in which the Coroner has returned a finding of septicæmia caused by illegal operation when the unfortunate women have not been pregnant, though they thought they were.

4. The reason for a certain cause of death being given is not always readily appreciated in the light of the history, for example, cause of death, myocardial degeneration; actual facts, cardiac failure after Cæsarean section for difficult labour. It must

be understood that a statistician cannot be expected to do other than accept the medical practitioner's certificate and unless definite investigation be made, there would be no reason to question it.

5. Certain deaths have occurred in which it seems humanly impossible to certify accurately the cause of death.

A woman, aged thirty-two, who had had five children, had a normal labour in a private hospital. On the fourth day she developed delusions. She left hospital on the tenth day in charge of two nurses. After being home two or three days there was a rise in temperature. Several consultations were held between her practitioner, consulting physician and consulting surgeon without a diagnosis being arrived at. An abscess developed in the buttock six weeks after confinement, but no source of infection was found. She died two months after confinement and death was classified as due to puerperal septicæmia.

6. Certain deaths which in my opinion should not have been ascribed to puerperal causes, were necessarily placed in that category, as shown by the following examples.

A very stout, flabby woman with a persistent thymus gland (proved *post mortem*) died from heart failure after the first few inspirations of ether given by the open method. The fact that the anæsthetic was administered in connexion with parturition automatically causes this death to be classified as puerperal.

I am given to understand that if a person died under an anæsthetic administered for the purpose of opening a septic finger the death would be ascribed to the disease or injury for which the anæsthetic was administered.

A patient was delivered of twins. Copious foul discharge and bleeding during birth drew attention to the presence of cancer of the cervix. As the patient gradually became exhausted and died after child-birth, the death is classified as puerperal.

A patient developed pneumonia on the day following confinement. She died six days later with subnormal temperature. The lochia were perfectly normal throughout. The death was classified as puerperal, though in the opinion of the practitioner death was due to pneumonia.

In a normal labour lasting between two and three hours, when the placenta was being expressed, the patient collapsed and died. Death was stated to be due to myocarditis, but was classified as puerperal.

A patient suffered from goître for two years and was sent to Sydney from the country when six months pregnant with a view to termination of pregnancy. Tachycardia, orthopnœa, tremor *et cetera* were present. Labour was induced under ether given by the open method and taken very badly. The patient developed pneumonia one week after labour and died on the twelfth day.

Many more similar instances could be given, but those mentioned will suffice. It will be seen from these few examples how readily statistics lend themselves to differing results according to the accuracy and method of compilation. If a medical certificate is accepted at its face value, quite a number of puerperal deaths will be placed in other categories.

If deaths which may or may not be due to puerperal causes are classified, without further inquiry, according to the certificate of the medical practitioner, it is obvious that the statistics must underestimate the actual maternal mortality. Further, whilst the "International Classification List of the Causes of Death" is intended to be used in exactly the same way, there are numerous possibilities for difference of opinion in classifying particular deaths.

Being alive to all the pitfalls mentioned, one is forced to be sceptical when conclusions are drawn from statistics of different countries, since the basis of comparison may be totally fallacious.

Holland is frequently put forward as a country with a very low maternal mortality. For reasons given I have always been doubtful in accepting its statistics at their face value. It is therefore interesting to note that Professor Marshall Allan who was recently in Holland, states:

From personal observations and after conversations with the authorities in Holland I am dubious of the correctness of their statistics, especially those of puerperal sepsis. The standard of classification appears to be different from that in use here. (The Medical Journal of Australia, April 12, 1930, page 484.)

Whilst dealing with this aspect of the problem, I wish to say that the maternal mortality statistics of New South Wales are as accurate as is humanly possible and strictly in accordance with the intentions of the International Classification List. In fact I suspect them of being so honest as to be disadvantageous to us in any comparison with most other countries.

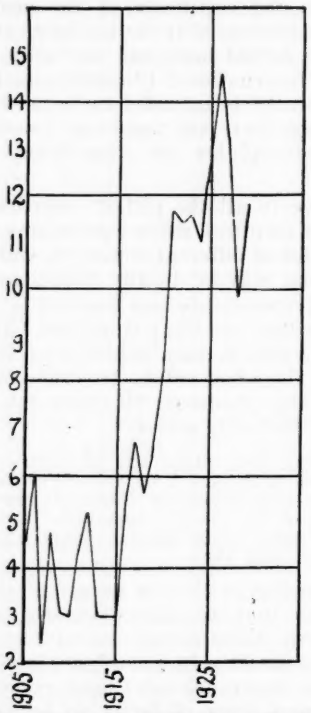
I desire now to offer a few observations in regard to certain specific causes in maternal mortality.

Illegal Operations and Accidents of Pregnancy.

Interference with pregnancy, whether with criminal intent or by deliberate meddling on the part of the pregnant woman herself, is apparently becoming more frequent. It is a very interesting speculation why the proportion of illegal operations should have soared from 1915 (*vide* graph). Is this merely one of the many inexplicable post-war phenomena, an index of the rising cost of living or an indication of the increasing popularity and facilities for abortion? There is little doubt that many cases of interference with pregnancy do not come under the notice of the police and the death, if it occurs, is classified under "accidents of pregnancy" which, whilst more respectable as a classification, unfairly penalises the mortality rate. The preponderance of deaths of married women among deaths due to illegal operations is in my opinion a most disquieting sign.

It is not without significance that whilst the total population is more or less equally divided between Sydney and the remainder of the State, the illegal operations and deaths from abortion and miscarriage constitute a city rather than a State

problem. Naturally the city offers a ready means for temporary disappearance of the individual, but it also apparently offers ready means for procuring the desired termination of pregnancy.



Graph showing maternal mortality from illegal operations in New South Wales. The abscissa shows the percentage of total maternal deaths.

It should be noted that more than one-third of the deaths from puerperal septicæmia occur subsequent to abortion and miscarriage, so that where efforts to terminate pregnancy are frequent, the rate for puerperal septicæmia must necessarily be high. This mortality which is not decreasing, penalizes our maternal mortality rate very definitely and will certainly prevent the desired reduction of that rate until the social cause or causes underlying these deaths can be controlled.

In passing it may be mentioned that the necessity for more hospital accommodation in Sydney for the treatment of septic abortions is very great. Nobody wants these patients and were it not for the Coast Hospital which deals with between seven hundred and eight hundred cases *per annum*, the position would be scandalous.

At present there appears to be little hope of controlling these deaths. Public opinion is not definitely antagonistic to the termination of pregnancy. The woman herself does not care what might happen, provided it does not happen to her, and to complete the picture some of our daily newspapers publish hypocritical "sob-stuff" regarding maternal mortality on one page and on another page advertise "steel and apiol pills" or some other alleged abortifacient.

Puerperal Hæmorrhage.

I suppose there will always be a great difference of opinion regarding the treatment of the various forms of hæmorrhage. Apart from the technical view of obstetric experts, the popular press correspondent considers that all such deaths are unjustifiable and due to the neglect of the medical attendant in not turning off the tap in some way.

It is perhaps easy to offer advice when one is not faced with the immediate problem of controlling hæmorrhage and I do not therefore wish to adopt the rôle of critic. I am merely giving you some of the facts gleaned up to the present in order to indicate the difficulty or the possibility of avoiding some of the pitfalls in the field of midwifery. Is it reasonable, for example, for a medical practitioner to leave a woman who has had a severe *post partum* hæmorrhage in a house, attended only by her husband? In one instance a visiting nurse was in attendance at intervals, but during her absence the woman had a recurrent hæmorrhage and died before the arrival of medical aid. Can this death be ascribed to improper training of the medical student or lack of knowledge on the part of the practitioner?

Other instances may be quoted which are open to argument. Should *post partum* hæmorrhage be controlled by packing of the uterus or is this unphysiological, since the uterus cannot be kept contracted and retracted with gauze inside it? I realize that it may be a last effort to control a desperate situation, but the evidence so far does not fill one with enthusiasm for its effectiveness.

Hæmorrhage from *placenta prævia* is another bugbear for the practitioner to face single-handed as an emergency. I have little doubt that every final year student knows the fundamental principles involved in its control. Nevertheless, *accouchement forcé* with rapid extraction of the child is frequently carried out with fatal results. Who is to point the accusing finger when the practitioner, isolated from help, commits an error of judgement regarding the most suitable treatment of a condition which he may meet only very infrequently. *Placenta prævia* occurs in about one in one thousand births. If the average practitioner attends one hundred confinements annually, he may only meet with a case of *placenta prævia* once in ten years. The popular press correspondent will, of course, declaim vociferously, but can anyone eliminate the human element in these matters?

The evidence so far available shows that in most instances of hæmorrhage which prove fatal, the medical practitioner is called in after the complication arises and is not present at the time when the hæmorrhage first occurs. Many of the patients have been some miles in the country and were practically moribund on arrival of the doctor. Certain of the patients, though warned beforehand, refused to take advice to be confined in town where medical assistance was available. The majority of deaths from *post partum* hæmorrhage did not result from a single large hæmorrhage, but from bleeding which

recurred subsequently after the first hæmorrhage had apparently been completely controlled.

It may be mentioned that many practitioners complain of the inefficacy of certain pituitary gland preparations in controlling serious hæmorrhage and it seems that in the fatal cases the patients die in spite of every approved method of treatment.

Puerperal Septicæmia.

Certain remarks have already been made regarding septicæmia following abortions and miscarriages, but here it is necessary to deal with septicæmia following full time labours.

So far investigation has been made into twenty-eight deaths falling within this category. Space does not permit me to give their individual histories which are very instructive and interesting, and I have therefore summarized them as briefly as possible (Table II).

TABLE II.

Deaths from Puerperal Septicæmia Following Full-time Labours.

Condition.	Number.
Normal births, doctor present[1]	6
Normal births, doctor not present[1]	11
Abnormal births involving interference—	
Placenta prævia	1
Cæsarean section owing to previous ventrofixation of uterus	1
Adherent placenta manually removed	2
Impacted breech	1
Forceps:	
(*a*) Anterior position	3
(*b*) Persistent occipito-posterior turned to anterior	2
(*c*) Persistent occipito-posterior delivered in that position	1
Total deaths	28

[1] Normal birth signifies that the woman delivered herself naturally; a vaginal examination was made in only one or two instances.

This is only a partial picture of all the facts, but it suffices to show certain features which deserve notice. Of these septicæmia deaths 60% followed normal deliveries in which no interference occurred, and in nearly two-thirds of these normal deliveries no medical practitioner was present.

It would appear, then, that the medical practitioner is not so culpable as is sometimes thought, since he certainly cannot be blamed for these cases. Several of these deaths following uncomplicated delivery were those of aboriginal women who were confined by their aboriginal sisters, but though this appears to be getting back to Nature, it did not prevent a huge perineal tear in at least one instance. Many of the women were confined in their own homes which were most unsuitable for the purpose, being dirty, without reasonable facilities and sometimes the abode of poverty. In one country case there were "myriads of flies on all hands, perineum and the oncoming head of the child."

In many of these fatal cases, one the wife of a medical practitioner, the patients were supervised throughout pregnancy, subjected to no vaginal examinations and yet developed septicæmia. These are the inexplicable cases, the reason for which has produced numerous theories, but no satisfactory explanation. The complicated deliveries necessitating interference accounted for eleven deaths, in six of which forceps were applied.

Whatever may be thought of the merits or demerits of the actual technique, the outstanding fact remains that in each instance the circumstances necessitated interference, sometimes urgently and in unsatisfactory surroundings.

Puerperal Albuminuria and Eclampsia.

The puerperal albuminuric and eclamptic group ranks next to puerperal septicæmia as the second greatest cause of maternal mortality. Australian mothers appear to be extremely susceptible to puerperal toxæmia and it is difficult to ascertain with any precision the reason underlying this outstanding fact. It appears to be associated in some way with the national diet of a country and is most marked in those countries—United States of America, Argentine, Australia *et cetera*—in which meat forms an ample proportion of the diet.

It was found in certain countries, particularly Austria, which had a very severe experience as the result of the war, that the post-war conditions which involved semi-starvation of the community, had practically eliminated the problem of eclampsia. Against this we have the fact that certain herbivora —the cow and the mare—are said to suffer from this form of toxæmia. Whilst the actual cause underlying this condition is not definitely known, we possess sufficient information to enable us to reduce the number of fatalities therefrom. The reason why this knowledge is not applied can be summed up in one word—indifference.

The indifference of the public is due to ignorance and in many instances perversity, but one regrets to state that there is also a culpable indifference in a section of the medical profession. Thirty-five deaths from toxæmia or eclampsia have been investigated. Nearly 70% of the patients received very inadequate or no prenatal supervision during pregnancy. In many instances the patients were advised to send specimens of urine, but neglected to do so and were not followed up by the practitioner. This is a responsibility which in my opinion should not be shirked by the professional attendant. In most instances the practitioner has been called in when the patient has had one or more fits or has shown some urgent sign of intoxication.

Criticism is often heard of the official failure to educate women regarding these dangers. No one has yet evolved a practical scheme for getting into personal touch with the pregnant woman and it is only when she is in this condition, that she is likely to heed advice. If she will not be guided by a practitioner whom she engages for her confinement, it is doubtful whether she will pay any attention to others.

When an article has been published in a local newspaper giving advice regarding prenatal care, preparation for confinement *et cetera*, certain parents have protested strongly to the editor regarding the demoralizing effect of such information on

children who may happen to read the newspaper. Naturally the editor is inclined to pay more attention to the protest than to the potential good which may be effected by the article, and this avenue for propaganda becomes lost.

The histories of the twelve patients who received satisfactory prenatal care are interesting. Four developed eclampsia after confinement. Six developed eclampsia without warning when apparently in normal health. One was treated in hospital and owing to improvement was allowed to go home. She neglected advice and when her doctor next saw her she was practically blind. One discontinued attendance at a public maternity hospital antenatal clinic because, it is alleged, she could not pay the necessary two shillings fee. She subsequently developed eclampsia and died.

Only about 20% of the women who have died from puerperal causes (excluding ectopic pregnancy and abortion) have received more or less satisfactory prenatal care, and the majority of these did not seek advice before the sixth month of pregnancy.

Other Accidents of Child-Birth.

Other accidents of child-birth include such conditions as Cæsarean section, version, forceps application, difficult labour, rupture of the uterus *et cetera*. Much could be said regarding these deaths, but the time is not opportune. However, the following histories are submitted without comment and without prejudice. They are not unique, but are fairly true to type.

Number C.335: A *primipara*, aged twenty-eight, was under medical supervision throughout pregnancy. The membranes ruptured on the morning of March 28, 1929, when she entered a private hospital. Pains did not commence until night time. It appears that a party was being held at the hospital and the patient after a vaginal examination by a nurse was given a hypodermic injection.

On March 29, 1929, pains continued and liquor was draining all day. Under medical supervision two hypodermic injections were given at night.

On March 30, 1929, there were no pains. The patient felt in the way at hospital and with the doctor's permission went home and arranged to be confined there, a visiting nurse being engaged.

For the next two days the pains were somewhat irregular. She was seen by the doctor and nurse thrice daily and both examined the patient *per vaginam* at each visit.

On April 2, 1929, the patient felt ill and exhausted. The husband requested another opinion. On April 3, 1929, two local colleagues were called in. The cervix was stated to be now fully dilated and the presenting part (apparently some form of vertex) was well down in the pelvis. Forceps were applied twice, but slipped off. An attempt at version after six days of labour was then made without success, the obstacle being "a thick band of muscle round the uterus, probably Bandl's ring." The patient collapsed suddenly, was given stimulants and sent in ambulance to hospital. She died in the ambulance before reaching hospital.

The certificate of death was: (1) Parturition, (2) primiparity, (3) persistent mento-posterior presentation. The actual cause of death was rupture of the uterus.

P.891: A *primipara*, aged twenty-six, was under medical supervision during pregnancy. The presentation was persistent occipito-posterior. The patient was in labour for forty-eight hours. Attempted rotation into the anterior position was unsuccessful. Forceps were applied with success when full dilatation had occurred. There was a large but incomplete tear of the perineum and the vaginal tissues were much bruised. The perineum was sutured, but a large slough came away on the third day. The patient ran a high temperature, but was otherwise considered to be doing well. Eventually she passed fæces *per vaginam* and on the fourteenth day of puerperium was transferred to a public maternity hospital. Here it was discovered that the vagina was torn high up behind the cervix into the rectum. The patient died soon after admission from puerperal septicæmia.

P.922: A *primipara*, aged sixteen, had no prenatal supervision. The presentation was occipito-posterior. Unsuccessful attempts to deliver by forceps were made. The doctor stated that the patient had a "male pelvis" and that Cæsarean section was necessary. He sent the patient next morning into a public maternity hospital where manual rotation of the vertex into an anterior position was effected and the child delivered. The patient died two days later from septicæmia.

P.926: A *primipara*, aged twenty, consulted a doctor at seven and a half months. The urine was examined every fortnight. The presentation was stated to have been right occipito-anterior two days before labour, but at actual labour the presentation was a breech. The nurse did not call the doctor until after the patient had been in labour for forty-eight hours. The condition was diagnosed as an impacted breech and an unsuccessful attempt was made to bring down a leg. On the third day of labour the patient was sent into a metropolitan maternity hospital. This involved a journey of nearly one hundred miles. In hospital a leg was brought down and a macerated fœtus of ten and a quarter pounds was delivered. The patient died from septicæmia the following day.

B.222: A patient, aged thirty-three, who had had two children, had unsatisfactory prenatal supervision, though measurements were said to have been taken and found normal. The presentation was right occipito-anterior, with a large head. After labour had progressed for two days, with indications of uterine inertia, forceps were applied. This proved unsuccessful. The patient was kept under anæsthetic for two and a half hours, during which time apparently all the devices and manipulations of the obstetric art were tried without success. These included craniotomy, cleidotomy *et cetera*, but the patient died from shock whilst still undelivered.

G.412: A patient, aged thirty-eight, who had had seven pregnancies, came under medical notice six weeks before labour, when she is said to have been suffering from hydramnios. Labour commenced on June 2, 1929. Chloroform was administered at 5 a.m. on June 3, 1929. The head was born about 6 a.m. on the same date. Labour pains were alleged to have stopped abruptly, so the patient was made comfortable and allowed to remain with only the head born for six hours until medical assistance could be obtained from a neighbouring town. It was impossible to obtain accurate information beyond the fact that the doctor was unable to deliver the shoulders. The child was said to have been dead for some days with signs of maceration. On the arrival of the medical assistant, ether was administered by him. After a few minutes the patient vomited, became distressed and died.

Conclusion.

In concluding this somewhat disconnected outline of the investigations so far carried out by Dr. Sandford-Morgan and myself, I wish to thank the individual members of the profession who have kindly supplied the necessary basic facts. Especially do I thank the Government Statistician and his staff for unfailing courtesy and for the enthusiastic assistance which forms the foundation of this investigation.

Whilst acknowledging the great assistance afforded by the metropolitan public maternity hospitals in granting access to records, I should like

to point out that these records are too frequently very unsatisfactory. Essential facts of the history are not recorded, the treatment given can often be ascertained only by reference to notes kept in wards and there is rarely any information regarding the opinions or directions of the honorary staff.

I have endeavoured throughout to be strictly impartial and though my judgement or interpretation of facts may be open to criticism, I trust that my sincerity will be above suspicion.

Further, it is hoped that this paper may assist, in some small measure, in throwing light on the problem of maternal mortality and that it will justify the continued support of the profession in order to obtain a comprehensive survey of this important field of research.

SOME COMMENTS ON PREMATURE INFANTS.[1]

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I FEEL I must begin by apologizing for the incompleteness of these notes. This incompleteness is due particularly to two facts. First, that in practically no case of death in these premature infants have we been able to have *post mortem* examinations. Thus in the great majority of cases we are really in ignorance of the cause of death. In the case of one premature baby whose weight at birth was five pounds six ounces and who was admitted to Tresillian at the age of four weeks with the history of vomiting and loss of weight, a *post mortem* examination done at the Children's Hospital disclosed congenitally diseased kidneys. There is no doubt that such examinations would reveal in a certain proportion of these babies other conditions which are the cause of death rather than the prematurity itself. Secondly, these notes must be incomplete because of the difficulty of following up these infants after they pass from the hospital or Tresillian. I have been able to follow up to various ages only 61 of over 400 premature infants who have been under observation.

Chances of Survival.

The chances of a premature baby to live depend upon various circumstances which have been classified as follows: (i) Antenatal influences, (ii) intranatal influences, (iii) postnatal influences, (iv) ætiological influences.

Antenatal Influences.

The antenatal influences are enumerated as follows:

1. Fœtal age. The younger the fœtus, the less are its chances of survival. In this series only one infant survived whose fœtal age, as far as it is possible to be sure, seemed to be definitely six months.

2. Physiological development as determined by the following factors:

(*a*) Weight. Feldman states that the chances of the baby weighing four and a half pounds at birth are eleven times as great as that weighing two and a quarter pounds. The smallest infant who survived at Tresillian, weighed one pound fourteen ounces. At the Royal Hospital for Women a baby weighing one pound fifteen ounces and whose length was only eleven inches and whose fœtal age was probably under six months, survived three weeks.

(*b*) Length is perhaps a more accurate estimation of prematurity than weight. The only infant under fourteen inches (thirteen and a half inches) in length at birth who survived, had hydrocephalus and was taken out of hospital against medical advice on the fourteenth day. This infant weighed two pounds ten ounces at birth and cannot have survived long after its discharge from hospital.

Feldman quotes the following as the length of the fœtus: At twenty-seven weeks, 14 inches; at 29 weeks, 15½ inches; at 31 weeks, 16½ inches; at 33 weeks, 17 inches; at 35 weeks, 18½ inches; at 37 weeks, 19 inches.

(*c*) Body temperature. As is well known, these infants are unable to regulate their body temperature and the more premature they are, the more difficult it is to keep their body temperature up. If once allowed to get chilled, their chances of life are greatly diminished.

In a series recently reported by Hess of the infants who on admission to the premature department registered 32·2° C. (90° F.), 100% died; of those with a temperature of 33·8° C. (93° F.), 91% died; at 34·4° C. (94° F.), 76% died; at 35° C. (95° F.), 70% died; at 35·6° C. (96° F.), 54% died; at 36·1° C. (97° F.), 35% died; at 36·7° C. (98° F.), 27% died. In other words, there was a gradually diminishing mortality rate with a rising temperature. If the infant cannot be kept warm, the prognosis is hopeless.

(*d*) Development of its feeding apparatus as represented by the nervous mechanism concerned with swallowing and sucking.

(*e*) Development of its respiratory apparatus.

3. Presence or absence of abnormalities, for example, hare lip and cleft palate.

4. Presence or absence of transmissible disease such as tuberculosis and syphilis. In this series syphilis has been surprisingly infrequent. Even in cases where there have been several previous premature births, the mothers' blood has given no reaction to the Wassermann test.

Intranatal Influences.

Any obstetrical manipulations on a premature infant will jeopardize its life. Owing to the delicacy of their blood vessels they are peculiarly liable to

[1] Read at a meeting of the Section of Obstetrics and Gynæcology of the New South Wales Branch of the British Medical Association on June 18, 1930.

hæmorrhages, especially cerebral. Any instrumental delivery, however easy, is liable to be followed by subcutaneous hæmorrhages about the head.

Postnatal Influences.

Postnatal influences include the general care of the infant and the skill with which that care is given. The importance of this factor is shown by figures taken from the records at the Royal Hospital for Women.

For two years before the institution of the special mothercraft department the survival rate of premature infants was 56·5%. For the three years since the mothercraft department has been in operation, of a total of 321 premature babies 79·6% survived. Also the infants are now discharged nearly all breast-fed and in good condition, and the mothers are taught how to look after them and give them any special care they may still need.

The figures for Tresillian for 1929 are shown in Table I.

TABLE I.
Tresillian 1929.

Weight.	Number.	Died.
Under two pounds	2	1
Two to three pounds	19	0
Three to four pounds	15	2
Four to five pounds	10	0
Total	46	3

The mortality was 6·5% and 93·5% survived.

These results compare very favourably with those of a series reported by Hess and Chamberlain recently, in which 51·8% of 266 infants survived. However, of these infants only 27·4% were born in the institution. The rest were transported from other hospitals or from their homes, thus being exposed to the danger of chilling.

Ætiological Influences.

Ætiological influences include the causes which bring about premature births, such as toxæmia, pneumonia, heart disease *et cetera*, or induction for disproportion between the size of the child and the pelvis.

Toxæmias of Pregnancy.

During two years at the Royal Hospital for Women 21 mothers with albuminuria had 23 infants; 21 infants survived. One of these mothers had triplets, of whom two died. Twelve mothers suffering from eclampsia had 14 premature infants; eight did well and six died. Of these six one was born in a state of *asphyxia pallida*. One mother had triplets, two of whom died. That is, the children of mothers with toxæmia of pregnancy associated with albuminuria all survived except two of triplets. Of the mothers with eclampsia who had premature infants, only 25% survived.

All of these infants were a source of anxiety for some time after birth, many requiring to be tube-fed, to have gastric lavage and oxygen. Once they began to do well, however, they seemed to make normal progress.

The mother of one of these infants had ten fits *ante partum* and two *post partum*.

The infant weighed under three pounds at birth and was tube-fed at intervals for three weeks. Vomiting was troublesome for the first few days, and gastric lavage was carried out twice, and yet this infant had regained its birth weight on the fourteenth day. It went to the breast on the twenty-fifth day, when it weighed three pounds six ounces. Thereafter it went on well, and some months after it was discharged its condition was reported to be satisfactory.

The longest period for which I have been able to follow any of these infants born of toxæmic mothers is two and a half years, and one child of that age appeared to be perfectly normal in every way.

This infant weighed three pounds at birth and was admitted to Tresillian at the age of one month weighing two pounds fourteen ounces, with a length of sixteen inches. This infant was born at the Royal Hospital for Women. Its mother had eclampsia. Unfortunately this baby was born before we had special charts and records for the premature infants, but the fact that at one month old it still weighed under three pounds (its birth weight) is significant of the difficulties which had to be overcome.

Symptoms.

The main clinical symptoms which gave rise to anxiety in this series were the following.

Cyanosis.

Practically all the fatal cases suffered from cyanosis either continuously or intermittently, and a considerable number of those who survived, were also cyanosed with periods of apnœa. This condition was especially frequent in the smaller infants, although it occurred occasionally in the larger ones. One infant who weighed two pounds five ounces at birth, with a length of fourteen and a half inches, and whose fœtal age appeared to be definitely six months, was cyanosed for five days continuously. This infant was given oxygen for ten minutes every hour until the cyanosis lessened. Other infants had for several days intermittent attacks of cyanosis with periods of apnœa.

Clein in a recent study of 102 premature infants was able to examine 38 infants *post mortem*. From these examinations he has drawn up a tentative classification of cyanosis as follows:

(*a*) Continuous cyanosis, most often due to atelectasis.

(*b*) Intermittent cyanosis occurring during the first few days, usually the result of infratentorial hæmorrhage.

(*c*) *Ante mortem* attacks occurring often in infants dying of infection.

(*d*) Sporadic cyanosis for which some other cause, such as exhaustion, abdominal distension, difficulty in feeding *et cetera*, may be discerned at the time of attack.

This author found that infratentorial hæmorrhage was the cause of death in 50% of the infants who were examined *post mortem*.

Of those infants who died from intracranial hæmorrhage, the fœtal ages were as follows: Eight

were between six and seven months, eight were between seven and eight months, two were between eight and nine months.

Ten of these eighteen deaths occurred in infants under three and a quarter pounds, five in infants between three and a quarter and four and a quarter pounds, and three in infants between four and a quarter and five and a half pounds. From these figures it appears that the greater the fœtal age and the larger the infant, the less liable is it to intracranial hæmorrhage.

Vomiting.

Vomiting is a troublesome symptom in these babies. It occurs in practically all those who die, and frequently in those born of toxæmic mothers.

Forcible vomiting in which the vomitus is ejected through the nose as well as the mouth, is of grave prognostic significance. Very few of those in whom this type of vomiting occurs, survive. Gastric lavage is the best method of treatment and may have to be repeated several times.

In 57 infants under five pounds who survived, gastric lavage for intractable vomiting was carried out in 11 instances. In babies weighing over four and under five pounds, five or 18% required this treatment. Of those over three and under four pounds, three required it, or 23%, and of those over two and under three pounds, three or 50%.

One baby whose weight was between three and four pounds, suffered from severe vomiting on the forty-eighth day. Gastric lavage was performed four times. This vomiting was due to an infection which also at the time caused cyanosis requiring the administration of oxygen. This infant survived and did well eventually.

Diarrhœa.

Diarrhœa occurs usually in association with infections and is always a serious matter. A peculiar type of diarrhœa which I have not seen in any other condition, is that in which there are large, frequent, watery stools of a milky appearance. The stools suggest that the infant is unable to make use of its food. I at first thought that this diarrhœa was caused by overfeeding, but later was led to the conclusion that it was the result of a parenteral infection. Happily in this series of about four hundred infants infection has been rare, and I have only seen this peculiar diarrhœa in half a dozen cases, all except one of which were fatal. The infant who survived, was desperately ill and his condition for a while seemed hopeless. However, he is now a healthy, normal infant.

Jaundice.

Jaundice was marked in a number of infants and was troublesome because of the apathy which accompanies it. The jaundiced babies were all slow in making progress.

Infections.

Infections have been mainly naso-pharyngeal, in some cases followed by pneumonia. A naso-pharyngeal infection in these small infants is always serious, as there is a very great tendency to a generalized infection. Skin infections occurred in a few cases. But in this series obvious infections have been satisfactorily rare. It is, however, impossible to say exactly how many of the deaths were due to infections, as the signs and symptoms may be few and the condition only disclosed by *post mortem* examination. In those cases which were obviously due to infections, a rise in temperature was by no means usual, even when death occurred.

No effort should be spared in the care of these babies to protect them from infections and no one with a cold should attend them if it can be avoided.

There was no case of umbilical infection in this series.

Anæmia.

Premature infants are peculiarly liable to anæmia. This is said to be due to the fact that the store of iron laid down in the liver during the last three months of intrauterine life is lacking in the premature infant. Both human and cow's milk are deficient in iron and the full term infant has the store in its liver to call upon during the period of milk feeding.

Several infants of this series developed an anæmia of the chlorotic type with low hæmoglobin, but only slight diminution in the number of red cells. One seen recently at ten months had a hæmoglobin value of 45% with 4,000,000 red cells per cubic millimetre, and no other abnormality.

This condition responds well to the exhibition of iron. All premature infants, therefore, by the time they are two months old have iron added to the food. This is continued until weaning time when the infant begins to take other iron-containing foods. The cases in which anæmia occurred, were those in which mothers neglected to give the iron as ordered.

Rickets.

Rickets was not observed in any of these infants who were followed up, although it is said that premature infants are peculiarly liable to develop this affection. Probably this was due to the fact that only those infants have been followed up whose mothers carried out instructions with regard to sun bathing and the administration of cod liver oil.

The Future Development of Premature Babies.

With regard to weight, the average age at which the infants between two and three pounds attained the average birth weight of full term infants, was fifteen and a half weeks. In those between three and four pounds it was ten and a half weeks, in those between four and five pounds it was eight weeks, in those between five and six pounds it was four weeks.

Without wearying you with figures from the consideration of the development of these sixty-one infants who have been followed up for varying periods, it appears that those infants whose birth

weight is under four pounds, do not attain the average weight or length for at least two years and sometimes longer.

Of those infants between four and five pounds at birth all that had attained one year were the average or above the average weight and length for their age. Much depends on the care which they get during their first year. Several of these small infants had passed through attacks of whooping cough and this had obviously delayed their progress.

This series is perhaps too small to enable one to draw definite conclusions, but, given proper post-natal care, it seems that one may expect a premature infant born with a birth weight over four pounds, to attain the average physical development by the time it is a year old.

Those born with a birth weight under four pounds apparently do not attain the average weight and length until they are two or three years old, and may not do so until they are five or six.

None of these children showed any mental defect.

SOME OBSERVATIONS ON THE PRINCIPLES, METHODS AND RESULTS OF MODERN RADIUM THERAPY FOR MALIGNANT DISEASE.

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ONE of the outstanding features of recent medical research is the amount of work upon the ætiology and treatment of malignant disease. Thinking men the world over feel that surgery has not proved equal to the task of curing cancer in a satisfactory number of cases. Although surgery has been pushed to its uttermost limits, cures have been few and then only after serious mutilation. And this is seen with uterine, mammary and gastric cancers which must be considered suitable for surgical operation, even when the diagnosis is made apparently early. It seems necessary, therefore, to attack the problem otherwise, and physico-chemical methods immediately suggest themselves. It may be said that up to the present time the only reasonable alternative to surgical treatment of cancer is irradiation therapy by means of X rays or radium. The amount of energy and money being concentrated upon the study and development of radium therapy in England and Europe is amazing and never before in the profession has there been such a mass movement in favour of an alternative to surgery. It would be incorrect to say that radium therapy has yet proved itself a rival of surgery, nor indeed is this necessary to be so. It may well be that it will become incorporated as an integral part of surgical technique and surgical methods.

The writer has taken the opportunity of observing and studying the methods and results of radium therapy in countries abroad and will endeavour to indicate the present stage of its development and the principles upon which it is working. Attention will be restricted to the consideration of radium treatment for malignant disease. Naturally, the writer views the subject from the surgeon's standpoint, for it is his opinion that the future of radium therapy must be largely in the hands of the surgeon. Any person contemplating the practice of radium therapy must understand the physics of radium and this may be acquired without much difficulty. But equally necessary and more difficult to acquire, is an intimate clinical knowledge of malignant disease as it occurs in the living patient—of its anatomy, its pathology and its variations. This can be expected only of the operating surgeon. It may be said at once that the underlying principles of radium therapy are few and straightforward. Nevertheless the logical and intelligent application of these principles to individual cases is difficult and, judging from what one has seen in different clinics, somewhat uncommon.

General Considerations.

Radium is a member of the group of radio-active elements of which some forty are known. A radio-active element is one whose atoms spontaneously disintegrate into another new atom. This process is accompanied by the emission of positively charged atoms of helium—α rays—and of negative particles or electrons—β rays—and of γ rays. The α and β particles are parts of the disintegrating atom and the γ rays are the consequential effect of their emission. All three are capable, in different degrees, of affecting biological processes and this depends probably upon their power of penetrating living matter. In this respect the γ ray is easily supreme.

Alpha Rays.

In practical therapeutics α rays play no part because they are unable to penetrate the wall of any container or needle. Nevertheless by using polonium as a source they are known to be capable of causing biological disturbances upon microbes and blood cells. If the skin be made artificially absorbent by soap and water, the α rays are capable of causing a very superficial lesion. It is estimated that the α ray is ten thousand times less penetrating than the γ ray.

Beta Rays.

Beta rays also play very little part in modern methods and indeed present day curie-therapy largely depends upon the possibility of excluding β rays from the irradiated tissues by means of filters and screens. The significance and importance of using screened radium were first shown by Dominici whose researches were published in 1907. It is known that 0·6 millimetre of platinum is capable of absorbing 99·9% of β rays from a source of radium however high the linear intensity. Experimentally the effects of β rays can be studied by using unscreened radium or by taking advantage of the

fact that β rays are deviated by a magnetic field. It can then be ascertained that in sufficient dose they act as a caustic upon all tissues normal and neoplastic, irrespective of histological nature. The resulting lesion is one variety of radium burn and it is interesting to observe that its depth never exceeds one to two centimetres of any tissue, no matter how high the intensity nor how prolonged its application. In other words this is the limit to which β rays are able to penetrate the tissues.

Gamma Rays.

The γ rays are the therapeutic rays and have three important characteristics. The first is their remarkable power of penetrating matter. They are a complex beam composed of unequally absorbable components, the most penetrating of which can pass through several centimetres of lead and 50% are unabsorbed after passing through ten centimetres of tissue. In this respect they are one hundred times superior to β rays and excel the most penetrating of the X rays. The hardest γ rays have a very short wave length. The second characteristic is that in appropriate dose they are capable of so profoundly altering the metabolism of cells, normal and neoplastic, that the cells cease to function or to grow or to reproduce or to exist. The third characteristic feature of γ irradiation is that all tissues are not equally susceptible to it, the cells of many cancers being more affected than the fixed somatic cells of healthy tissues. It is of fundamental importance to realize that this selective effect of the γ ray occurs only within definite limits of dosage below which there is no effect and above which there is no discrimination, "all tissues being united in death." Successful curie-therapy is possible under only two conditions, first, that the cancer to be treated is more sensitive to γ rays than the surrounding normal tissues and, second, that this radio-sensitivity can be realized under conditions similar to those under which cancer occurs in the body. Anatomical or physiological or pathological circumstances may make it impossible to give a sensitive cancer a lethal dose of γ irradiation; for example, a cancer of the œsophagus is probably quite sensitive, although so far no satisfactory technique has been devised by which it can be given an adequate dose without mortal damage to the patient.

Radio-Sensitivity.

Since radio-sensitivity of a neoplasm definitely decides the possibility or otherwise of its cure by radium, we must discuss it more fully. What we want to know is how it is caused, how it can be estimated and how it can be altered. Unfortunately these questions can be answered only very imperfectly, because so little is known about intracellular physiology and still less of the mechanism by which γ rays disturb this physiology. As has been said elsewhere, all tissues normal and neoplastic are, as a fact, radio-sensitive and none can survive sufficiently intense nor prolonged irradiation. Therefore it is an attribute which varies only quantitatively in all living tissues. The fundamental observations are that in any organ or tissue capable of being affected by therapeutic doses of γ rays, certain varieties of cells are altered, whilst others in the vicinity are unaffected or less affected. Excellent examples are to be seen in seminal epithelium, normal skin and rapidly growing cancers. Closer examination reveals that some histological types are more sensitive than others and, furthermore, the important fact that this sensitive condition is not constant, but the same cells seem to be more or less so at different phases of their life and under certain conditions. In 1903, as the result of his observations upon the effects of irradiation on developing ova, germinating grains, granulating wounds, developing limbs and cancerous growths, Perthes drew attention to an apparent connexion between the radio-sensitive condition of the cell and its reproductive activity. Accumulated experience confirms these observations which have been incorporated into a law by Bergonie and Trinbondeau, the tenor of which is that the most sensitive cells are those whose morphology is indefinite, whose multiplication is frequent, whose metabolism is intense and whose life is naturally brief. One of the vulnerable periods of cell life appears to be round about the karyokinetic interval which is frequent and prolonged in rapidly growing tissue. It is to be observed that, like all other biological phenomena, radio-sensitivity is ultimately cellular, not strictly speaking an attribute of tissues or organs, probably located in the nucleus, if not actually in the chromatin. It is said that there are histological criteria of radio-sensitivity and so by microscopy the initiated can forecast more or less accurately the behaviour of the tissue when it is submitted to γ irradiation. The French pay the greatest attention to this and rarely undertake the treatment of a case without a preliminary biopsy. For practical purposes the standard of radio-sensitivity is that of the skin and no cancer less sensitive has much chance of being cured by curie-therapy.

We may conclude, therefore, that structure and function of a cell are in some way connected with its susceptibility to γ rays, but there are other factors to be considered in this complex problem, for example, what part is played by the stroma and by the intercellular substance? It is not certain, at least for neoplastic tissue, that some of the effects of γ rays are not indirect upon the cell through the stroma or intercellular tissue. Bone bears iradiation very badly and so does cartilage, especially when it is ossified or calcified. It may be that this is due to excess of secondary rays formed *in situ* owing to the calcium and phosphorus. The vascularity of the supporting tissues is undoubtedly important—lingual carcinoma is less amenable to irradiation when it occurs in a syphilitic fibrosed tongue. It makes no matter whether this is due to the cancer becoming less sensitive or the surrounding tissues less resistant, it comes to the same thing in practical therapeutics—the cancer is more difficult to cure and burns occur more readily.

Sepsis in some way upsets the relative radio-sensitivity of the growth and of the surrounding parts, often prohibiting adequate dose and favouring radium necrosis. The nature of the irradiation must also be considered qualitatively and quantitatively. It has been suggested, but not proved, that different wave lengths may have specific effects, as is the case with wave lengths of light falling upon the retina. An optimum degree of intensity is essential to obtain the fine cell discrimination of selective action, but the absorption of rays by the thickness of overlying tissues and of the tumour itself makes it difficult to maintain this uniformly. Finally, radio-sensitivity of cancerous tissue is profoundly altered by previous X ray or radium treatment insufficient to sterilize it. It becomes more resistant, as though it has developed an immunity to the rays. This important and extraordinary fact was discovered in 1914 independently by Regaud and Delbet, and it seems to be peculiar to cancerous tissue, not having been demonstrated in normal tissue (Regaud). Its consequences are important for curative, though not necessary for palliative, therapy and at the Radium Institute, Paris, they are most reluctant to accept a patient for treatment who has undergone previous unsuccessful irradiation.

It can be concluded that radio-sensitivity is a recondite problem and there is much that is difficult to explain on microscopical evidence alone. Rodent ulcer is a glaring anomaly, because it is among the most sensitive and satisfactory to treat and yet it is one of the most slowly growing of cancers. Sepsis is present in the majority of cancers and very often adventitious disease such as syphilis. The intensity of the irradiation can never be actually controlled, because no means exist by which the degree of absorption can be calculated and therefore the actual dose received by the tumour. The blood supply may be naturally poor or pathologically reduced.

To sum up, under the conditions of practice one is obliged to use rays of various wave length and intensity upon a tumour of varying thickness composed of cells of unequal radio-sensitivity supported by tissues of all degrees of vascularity and of radium tolerance. And all these variables have bearing upon the relative radio-sensitivity of the growth and all surrounding normal tissues.

A useful working hypothesis has been suggested to account for some of these facts about the different behaviour of tissues to irradiation. It is supposed that all tissues, neoplastic and normal, contain two varieties of cells. One is concerned with growth, repair and reproduction; these are the stock cells. The other variety performs the functions of the tissue, such as nutrition, secretion, absorption and so on. These are the lateral offspring. The first would be comparable to the germ cells and the second to the somatic cells of the adult body. The germ or stock cells must be reckoned to be immortal, because when they reach a stage of their existence they divide into two living daughter cells. The lateral offspring have a short tenure of life ending inevitably in sterile elements which are desquamated or absorbed. The highly organized and specialized tissues have by far more stock cells than lateral offspring. Radio-sterilization of a cancer is its total cure and results from the destruction of all the stock cells, a condition which is necessary and sufficient. It is not infrequently observed that some growths, although destined subsequently to disappear entirely, show little or no alteration immediately after treatment. This interval of time is called latence and is of some importance clinically. It may be explained as due to the fact that the stock cells have been destroyed and are not renewed, the delay being due to the natural effluxion of life of the more resistant lateral offspring.

Practical experience supports many of these suppositions about the radio-sensitive condition. All epidermoid epithelial cancers of skin and mucosæ covered by stratified pavement epithelium are sensitive and amenable to treatment. This group includes carcinoma of the *cervix uteri*. They represent the greatest number of cures. Epithelial tumours of adeno-carcinoma type, for example, of the gastro-intestinal tract, are much less sensitive and in the majority of cases unsatisfactory to treat. Included among these are carcinoma of the rectum and of the *fundus uteri*. Epithelial tumours of the genito-urinary organs are sensitive as a rule, sometimes extremely so, as seen in testicular and ovarian neoplasms. In the bladder and prostate technical difficulties are very great and keep the number of successful cases somewhat small. There is evidence that some tumours of the central nervous system, especially of the brain, are sensitive. There is considerable difference of opinion about spheroidal cell carcinoma of the breast. In England they are regarded hopefully, even for interstitial irradiation (Keynes), but French opinion is very guarded and on the whole somewhat unfavourable (Regaud).

Malignant connective tissue tumours may be extremely sensitive or very refractory. The undifferentiated, cellular, embryonic, rapidly growing forms give the best results.

Measurements and Units.

The sources of γ rays in common use are two in number: radium which includes the element and its active deposits, and radium emanation or radon which is its first disintegration product. For therapeutic purposes they are both packed in hollow metallic containers called needles or tubes. Radon is remarkable inasmuch as it is an inert gas, the heaviest known, which is destroyed so rapidly that in 3·85 days 50% has disappeared (its half life value) and in 7·6 days only 25% remains. The destruction is accompanied by the emission of α, β and γ rays. If one gramme of radium element is sealed in a container, there comes a time when the amount of radon being formed is equal to the amount being destroyed. This condition of radio-active equilibrium takes about one month and the amount of radon then present is called a curie, the radon unit. It occupies 0·6 cubic centimetre at standard

temperature and pressure. From a physical point of view one millicurie is equivalent to one milligramme of radium acting for 133·44 hours or 133 milligramme hours. Therapeutically, however, 3·4 millicuries destroyed are equivalent to one milligramme of radium element acting on the tissues for ten days. This is due to the destruction curve of radon which shows a loss of 16% per day.

The economical advantage of using radon in large institutions is very great and therapeutically it appears to be at least equal to the element. At the Radium Institute of Manchester, as well as at Paris, radon is used more frequently than the element. It is interesting to note that the original physical researches upon radon were made by two English physicists, Ramsay and Soddy, and it was first used therapeutically at the Radium Institute, London.

Physics of Irradiation.

The actual bringing of γ rays to the neoplastic cell must now be considered. The object of therapeutic irradiation is to maintain for a number of days an even, effective, lethal intensity throughout the whole tumour. Clearly this will be more difficult when the tumour is deep seated, extensive, bulky and irregular. Moreover, there are two important physical factors which very materially aggravate the problem. The first is due to the absorption of the rays by the overlying tissues and by the tumour itself. The amount of this cannot be estimated clinically. The second is due to the divergence of the rays as they leave their source. To some extent the effect of this may be gauged from Newton's law of the "inverse square of the focal distance," that is, the intensity of irradiation varies inversely as the square of the distance in a homogeneous and non-absorbing medium if the source is a point. Obviously the law is not absolutely applicable, but even for short distances the fall of intensity must be very great.

Now with both these physical factors cooperating the intensity falls very rapidly and very irregularly, so if homogeneous irradiation is to be maintained, some measures must be taken to counteract them. To overcome fall of intensity due to absorption, only the hardest and most penetrating of γ rays are used and these are obtained by filtering the source up to 1·0 and even 1·5 millimetre of platinum or its equivalent in other metals. Four devices have been worked out to overcome the rapid fall of intensity due to divergence. They are: (i) Increasing the number of ports of entry and so allowing cross fire, (ii) increasing the surface of the irradiating source, (iii) placing the sources of radium actually inside the tumour—interstitial irradiation, (iv) increasing the distance of the source from the tumour—teletherapy.

The first three of these devices necessitate multiple sources and the last requires a large quantity of radium.

Filters and Screens.

Filters are necessary to exclude from the irradiated part not only the caustic β rays, but also the softer, less penetrating γ rays. Screens are used to protect the surrounding normal tissues and safeguard workers in the vicinity by stopping all or greater part of the γ rays.

One of the greatest advances in radium therapy occurred in 1907 when Dominici showed the advantages of excluding β rays. Before this time irradiation was almost invariably followed by some necrosis of tissue which usually became infected and always healed slowly, often resulting in excessive scarring. Dominici furthermore showed that the β rays had comparatively feeble powers of penetration, never exceeding eight to ten millimetres of tissue, and as the deeper tissues therefore were not reached by them, therapeutic effects here must be due to the more penetrating or γ rays. In 1919 Lacassagne concluded as the result of his experiments, using filtered and unfiltered radium, that the caustic β irradiation was very rarely desirable therapeutically, and now its use is restricted to very small superficial lesions, such as skin warts. The tendency has been to increase the filtration in order to get only the hardest of the γ rays. The maximum in use is 1·5 millimetres of platinum or equivalent and this is not likely to be exceeded. Many metals in convenient thickness absorb all β and the softer γ rays, and brass, lead, aluminium, gold and platinum are in routine use as primary filters. When high linear intensities of radium are being used, these filters themselves become the site of secondary β and γ rays sufficiently numerous to be troublesome. Therefore, secondary filters, such as cork, rubber, wax and Columbia paste, have to be used as well. It is interesting to observe that filtering the β rays is purely quantitative—0·6 millimetre of platinum excludes 99·9%, no matter how high the linear intensity of the source. But with γ rays there is a qualitative sorting out as well. Absorption or penetration of these rays is a matter of wave length. Screens are used with large quantities of radium, such as one gramme and over. In the four-gramme bomb at Paris there is a screen of seven centimetres of lead covered externally with wax. A mild protest may be raised against the two millimetre lead screens for protection of the mouth during radium puncture of the tongue, on the ground that their efficacy cannot be justified theoretically as being worth the trouble of making.

Dose.

The smallest quantity of γ rays capable of destroying the cancer without hurt to the surrounding tissues is the aim of every treatment and obviously is the appropriate dose.

In radium therapy, by whatever method, the dose is the product of the intensity of the irradiation and the period of its application. The modern idea is to give a low intensity over a long time. The result is expressed in milligramme hours or millicuries destroyed and the last is decidedly preferable. We have seen that owing to absorption and divergence of the irradiation the initial intensity is very different from that which actually reaches the different

parts of the tumour—the received intensity. Moreover, we are unable to express the radio-sensitivity of the growth in terms of lethal intensity. It therefore follows that most doses are given empirically and conform to known standards which represent the limits of tolerance of the most sensitive of the surrounding tissues. For all surface methods of treatment naturally this will be the skin, and the dose necessary to give the epidermicide or peeling effect described by Regaud and Nogier is a widely accepted standard for all deep-seated tumours. Slightly less than this is requisite for cutaneous cancers. In interstitial work by radium puncture standards of linear intensity have been worked out for radium needles (and radon containers) which will be tolerated with impunity by the normal tissues for a known time.

Standard Methods of Technique.

There are three standard techniques in routine use, namely, (i) interstitial or radium puncture by needles and seeds, (ii) surface or cavitary by applicators, (iii) distance or teletherapy by plaques or bomb.

Interstitial Radiation.

Interstitial radiation is of chief interest to the surgeon and is by far the most economical method from the point of view of the amount of radium required. It has definite limitations and its use is indicated only if the lesion is of small volume or extent and if it is accessible or can be surgically exposed and isolated. It is the method of choice for all lingual, labial, buccal and palatal growths and for many of the cutaneous cancers. In England it is an accepted method of treatment for mammary carcinoma and rectal carcinoma and even for cancerous glands of the neck. The French attitude towards this method is expressed by Regaud in his Cavendish lecture, 1929, as follows:

> Theoretically applicable to a host of tumours of different kinds and variously situated, radium puncture has, however, in practice been reserved at the Radium Institute of Paris only for certain cancers of small size, cutaneous or subcutaneous, some varieties of cancer of the breast and above all for cancers of the tongue.

Two objections to the method are the difficulty of insuring uniform irradiation over a large area without multiplying the sources to unreasonable numbers, and the tendency for radium necrosis to occur. The small linear intensity necessary to prevent the last results in a very rapid fall of intensity over short distance from the needle.

Radium element in needles or radon in tubes is used. The standards of linear intensity are from 0·66 to 1·0 milligramme of radium element per linear centimetre (about 1·2 millicuries of radon). The lower figure is the better and has many advantages. It allows a longer time phase and is a more scientific unit and makes it very easy to compare doses with large institutions which use radium emanation. It is the unit in use in Paris.

It is desirable to have an assortment of needles of different active lengths, such as 1·0 centimetre, 1·5 centimetres, 2·0 centimetres and 3·0 centimetres. The diameter of all needles is fixed to a constant minimum and depends upon the filtration and strength required. The filtration is 0·5 or 0·6 millimetre of platinum; the lower figure is in use in Paris. Seeds are generally condemned and it is difficult to see how their use can be justified unless the lesion is extremely small or as complementary to a radium puncture. The objection to them is on account of their short active length which is generally only 0·3 millimetre. It would seem to be unnecessary labour and an impossible task accurately to place the large number which would be required to irradiate homogeneously a lingual carcinoma of the usual dimensions. Owing to the courtesy of Dr. Quick, the writer saw seeds being used as a routine at his clinic in the Memorial Hospital, New York. The time the needles are to be left in the tissues depends somewhat upon the linear intensity and largely upon the estimated radio-sensitivity of the growth; it varies from five to ten days, the smaller figures for the higher intensity. As all needles have the same effective intensity on tissue for one to two centimetres around it they should be spaced at this distance. The needles should be inserted parallel and accurately—no easy matter—and therefore the longest possible active length should be used, the probability of unequal distribution being thereby reduced. Care must be taken that all needles are securely fixed by sutures wherever possible. Imperfectly anchored needles have been inhaled or swallowed from the mouth and thereabouts with disastrous results.

Accurate radium puncture is difficult and requires skill, practice and judgement. In all tongue work a general anæsthetic is preferable, if not absolutely essential. For full details of this method in buccal carcinoma the reader is referred to Birkett's article in *The British Journal of Surgery*, January, 1930.

Cavitary and Surface Irradiations.

Cavitary methods are used in the vagina for uterine cancer, in the œsophagus, nose, mouth and maxillary antrum. The requirements for this method to be successful are a fairly radio-sensitive tumour and a dilatable or commodious cavity whose walls have a fair degree of radio-resistance. The vaginal cervical canal method of treating cancer of the *cervix uteri* is therefore the most successful. Surface methods are used for small cutaneous growths. The fenestration method for treating intrinsic cancer of the larynx is strictly a surface application.

There is a very widespread opinion that radium is superior to surgery for the treatment of cancer of the *cervix uteri*. The vaginal fornices and the cervical canal lend themselves admirably for the retention of applicators and allow a considerable amount of cross fire. In the majority of cases growths here are very radio-sensitive. The technique most commonly adopted is based upon the Stockholm method and the dose is generally about fifty to seventy

millicuries destroyed divided over three applications of nineteen to twenty-one hours each. One week intervenes between first and second and between second and third. For details see *Acta Radiologica,* Volume X, Fasiculus 1. Excellent accounts are also to be found in a pamphlet of the Cancer Research Committee of the Marie Curie Clinic published by H. K. Lewis, and by the report of the Radiological Subcommission of the Cancer Commission published by the League of Nations, Geneva.

The fenestration operation for intrinsic cancer of the larynx has given brilliant results and the prognosis for the voice is excellent. The operation consists of removing a window of thyreoid cartilage adjacent to the growth and inserting radium needles so that they lie parallel on the external surface of the growth without puncturing it. A tracheotomy during the five or seven days of the treatment is not essential, but advisable.

Some varieties of malignant disease of the maxillary antrum have been very successfully treated with radium. The best results are obtained when the cavity of the antrum is made freely accessible as by approaching it through the hard palate. The bulk of the growth is reduced as much as possible with spoons and then radium needles are packed in the cavity on gauze tampons.

In the œsophagus the radium is applied upon hollow or solid tubes, such as Symond's or Chubb's, which are retained against the growth. Gastrostomy is desirable in all cases and essential in some. So far results have been poor and this is due mainly to the impossibility of estimating by endoscopy and radiography the dimensions and asymmetry of the growth and, till this difficulty can be overcome, the dose can be only guessed.

Distance Therapy by Plaques and Bomb.

Distance therapy by plaques and bomb is the favoured method of the Radium Institute of Paris, where it has been developed to a high degree, and with few exceptions is their routine method of treatment of cancer. The underlying principle is to increase the distance of the source from the skin, so that falling off of intensity will be very much reduced between the skin and all parts of a deep-seated tumour. This follows from the law of inverse squares. A large quantity of radium is necessary and four grammes have so far been the limit. The distance varies from ten millimetres to ten centimetres and is regulated partly by the depth of the tumour and partly by the amount of radium that is available. The method finds frequent application for the treatment of secondary cervical glands. In such a case in Paris the area of skin irradiated would be 150 square centimetres and the distance seven to eight centimetres. About 400 to 600 millicuries would be destroyed. The distance is obtained by means of beautifully made and elaborate Columbia paste moulds. The treatment is severe and quite an ordeal for the patient when the reaction of the tissues occurs. In all cases the epidermicide effect is the aim. Adequate protection must be given to the jaws and larynx and trachea and so lead screens five to six centimetres in thickness are fixed on the mould which is so heavy that it is impossible for the patient to wear it for more than some hours per day and then he must be in bed. About two or three hundred milligrammes of radium element are required.

The bomb treatment is merely an extension of the same idea and is used when the growth is very deep beneath the surface, for example, the tonsil, nasal fossa, pharynx, thorax or pelvis. The distance of ten centimetres requires too much radium for a plaque where there would also be too much divergence of the irradiation and too much weight for the patient to bear in comfort. A bomb may have any quantity of radium, four grammes being quite arbitrary. It is suspended from a beam by a pulley and is arranged so that two patients can be treated simultaneously. It is impossible at present to foretell the future of bomb treatment which is being used at Westminster Hospital, London, in Paris, Brussels and New York.

Combination of Radium and Surgery.

Radium is sometimes used in conjunction with operative surgery. For example, after excision of malignant glands of the neck many surgeons are leaving radium containers along the lymphatic areas under the flaps for six to ten days. In some of the operations for rectal and uterine carcinoma this is done in the mesentery. In Paris such cases would be treated by Columbia paste plaques or the radium bomb or deep X ray therapy. Sometimes an organ or a tumour is exposed by operation so that it can be submitted to interstitial irradiation—the so-called surgery of exposure which seemed to promise so much. This is an established procedure in England and Brussels for rectal cancer, and the writer has seen the œsophagus and pharynx exposed for the purpose of interstitial therapy. The results are not always as good as might have been expected, probably because isolating the growth or the organ disturbs the blood supply too much and, furthermore, sepsis is inevitable, as the wound must be kept open during the period of the irradiation, the needles acting meanwhile as foreign bodies. Both of these factors upset the relative radio-sensitivity of the growth and of its surrounding parts and some necrosis seems to be unavoidable.

Radium Burns.

Something must be said about the overaction of radium. Radium burns are of two kinds, those due to β rays and those due to γ rays. The former are rare nowadays and are due to inadequate filtration. A β ray burn quickly appears and is quite limited, never exceeding two centimetres of tissue. It affects all tissues indiscriminately. Burns due to γ rays are still seen and are due to miscalculation of the amount of resistance of the surrounding tissues, commonly bone or cartilage. They are much more serious than β burns because there is no limit to

their extent or depth. They are of two kinds, immediate and delayed. The former is noticed soon after the irradiation and may appear as a persistent induration which slowly ulcerates generally in the middle of the lesion. The floor of the ulcer has a green-grey colour. Pain is severe and healing very delayed, owing partly to thrombosis of the surrounding blood vessels and partly to sepsis which is always present. The fibrosis which follows healing, may cause disfigurement or impair mobility. When bone and cartilage are affected, there is the usual tedious sequestration. Sometimes it is difficult not to mistake these lesions for a recurrence of the growth and further treatment has been given under this misapprehension with disastrous results. The delayed lesion of γ irradiation may not appear for months or years after the treatment and the exciting cause is often a trifling injury or perhaps exposure to heat or cold. A small ulcer resembling a trophic ulcer makes its appearance, frequently in an area of pigmentation or induration.

The explanation of these lesions is probably twofold—a direct spoiling effect on the surrounding cells whereby their vitality is permanently impaired and an indirect effect through the blood vessels which are reduced in size and number. Late necrosis has been observed in a mandible after irradiation and the exciting cause was tooth extraction. It is always worth while to consider the position if one is obliged subsequently to operate on tissues which have been submitted at some time to a heavy therapeutic or an excessive γ and X ray irradiation. Healing is likely to be delayed and disastrous sloughing has occurred when plastic operations have been attempted for repair of radium necrosis.

Results.

In considering the results of radium or of surgical treatment of cancer, it must be borne in mind that cancer kills in 100% of cases, and it is unlikely that any treatment will be found that will cure every case—there must always be a fair percentage of failures. Cancer not only kills, but it is often painful and always entails distressing symptoms, sometimes with much suffering. Therefore if radical cure is not possible, much may be achieved by palliative treatment. The importance of palliation is not to be despised, but to a large extent its justification depends upon the means of procuring it—the cure must not be worse than the disease. Now the majority of operations for cancer, often painful, dangerous and mutilating, are palliative, either frankly or furtively. Colostomy, gastro-enterostomy, gastrostomy are examples of the first. The radical operation for cancer of the breast is often an example of the second, because it has been estimated that in 50% of these cases that come to radical operation, the disease is already intrathoracic on account of deposits in the mediastinal glands which the operation of necessity ignores (Handley). Radium often offers palliation without pain, mutilation or risk.

Any form of radical treatment of cancer must pay attention to the primary growth, the lymphatic drainage and the distant metastases. So variable is malignant disease that they are not equally important nor require the same amount of consideration. The primary growth alone in rodent ulcer is the whole problem, whereas this is hardly worth while bothering about in melanoma, so appalling are the metastases. The majority of cancers fall into an intermediate group between these extremes, and typical examples are labial and lingual carcinomata where the primary growth and the glands are about equally important. At the present day it must be fairly admitted that radium therapy can undertake to deal with the primary growth alone.

The method of choice for dealing with cancerous glands remains surgical excision, radium therapy being at most complementary or supplementary. This represents prevailing conservative and responsible opinion in England and Europe.

Speaking more particularly, radium has proved that in capable hands it can cause disappearance of the primary lesion of cutaneous cancers, cancers of the buccal cavity which includes lips, tongue, cheek, palate, tonsil, floor of the mouth and antrum, intrinsic cancers of the larynx and cancer of the *cervix uteri*. Many observers in England would include carcinoma of the breast and a smaller number carcinoma of the rectum as well.

Occasional and brilliant results are obtained in some sarcomata and in tumour of the brain. The cause of failure in these and in the refractory varieties of malignant disease appears to be the narrowness of the margin between radio-sensitivity of the growth and of the surrounding tissues. Any means of increasing this margin would be a momentous discovery and research has already been made with this end in view. But at the present moment this indicates the limitations of radiotherapy.

No man can foresee the future of radium therapy nor forecast its position in surgical therapeutics; it must be regarded meanwhile as merely an additional form of treatment that has been made available to the discriminating surgeon.

Reports of Cases.

PREGNANCY AND RADIUM.

By H. A. RIDLER, M.B., Ch.M.,

Tutor in Obstetrics, University of Sydney; Honorary Surgeon, Royal Hospital for Women, Paddington.

MRS. E.F., aged thirty-one years, had four children, the first thirteen years and the last six years ago. She had no miscarriages. Her last menstrual period commenced on March 12, 1929. She was admitted under my care in a public hospital with the following report from the doctor engaged for her confinement:

> The patient was admitted into a hospital on December 30, 1929, her estimated date of confinement being December 19; her previous labours were normal,

she had a *post partum* hæmorrhage with the last one and hyperemesis at the fourth month with the present pregnancy. At one time she had radiotherapy of the cervix. (The patient stated she had one treatment four years ago for hæmorrhage because the mouth of the womb was too wide open. The treatment cured the hæmorrhage.)

The position of the fœtus was left sacro-anterior and the heart rate 132. Attempts were made to induce labour by the quinine and castor oil method on January 1 and 6 without any result. No further treatment was given till January 19, then pituitrin 0·25 cubic centimetre was given four hourly. After the second dose liquor and meconium started to drain away, but no definite contractions were felt. A foot prolapsed and on the night of January 20 the foot was brought down and traction applied. The fœtus died on January 20. Traction was maintained and 0·5 cubic centimetre of pituitrin given and vaginal examination revealed a cervix which could not be dilated. A hot vaginal douche was given on the morning of the twenty-first; traction was maintained.

On admission to hospital on the evening of January 21 the patient's temperature was 38·7° C. (101·8° F.) and pulse 108; the pulse and temperature continued to rise. On vaginal examination the cervix was dilated to the size of half a crown, just allowing sufficient room for the leg and umbilical cord which was prolapsed. The cervix was tough and cartilaginous and hopelessly undilatable.

Accordingly a supravaginal hysterectomy was done, the fœtus being left in the uterus and special care being taken with the packing around the cervix to prevent contamination of the abdominal cavity.

The patient recovered. There was some suppuration of the lower end of the abdominal wound and a copious vaginal discharge accompanied by rise in temperature for some days after operation.

Comment.

This case seemed of some interest after reading Dr. Bernard Dawson's report in THE MEDICAL JOURNAL OF AUSTRALIA, July 19, 1930, page 88, but unfortunately the details of the treatment by radium of my case are not available to me.

One treatment by radium cured the hæmorrhage, the dosage not being known. Pregnancy occurred four years after treatment.

According to the history labour did not set in, even after attempts at induction. One concludes that the undilatable condition of the cervix was due to the application of radium in view of the fact that the four previous labours were normal.

CONGENITAL DIAPHRAGMATIC HERNIA.

By A. DALY SMITH, M.B., B.S. (Adelaide),
Resident Medical Officer, Wooroloo Sanatorium, Adelaide.

CONGENITAL diaphragmatic hernia occurred in a full term child born to a *multipara* after a normal labour. When born, the child was in a state of *asphyxia livida*, but with artificial respiration breathed feebly a few times and then died.

At autopsy it was found that there was an exceedingly large hernial orifice in the right side of the diaphragm. It was 3·75 centimetres (one and a half inches) wide and about 18 millimetres (three-quarters of an inch) in antero-posterior diameter; its boundaries were the posterior thoracic wall and the vertebral column with the muscle forming an arch anterior to these. The rest of the diaphragm was normal in appearance. Through this protruded almost the whole of the right lobe of the liver with the gall bladder, the two portions, abdominal and thoracic, being defined by a constriction at the level of the hernial orifice. The gall bladder had an abnormally long cystic duct. The whole of the small intestine from the pylorus was in the right side of the thorax, the caecum and appendix occupying the dome. From there the large intestine descended vertically, about one-sixth of its length being in the thorax and the rest forming three coils in the abdomen. The kidneys, suprarenals and other abdominal organs were normal in shape and position. In the thorax the heart was normal in size and position. The left lung was normal and contained air. The right lung was rudimentary, being only about 2·5 centimetres (one inch) in length and did not contain air.

Reviews.

FACTS ON TUBERCULOSIS.

THE "Handbook on Tuberculosis," by Dr. B. S. Kanga, Medical Officer to the Turner Dispensary and Visiting Medical Officer to the Turner Sanatorium, Bombay, has been written to provide a summary of modern treatment of tuberculosis for the student in simple form.[1]

In dealing with the general characteristics of this disease the author has followed largely the teachings of F. M. Pottenger, with many references to the findings of Bandelier and Roepke, and in this respect gives a clear statement of well recognized facts. The author reviews briefly the methods of treatment of tuberculosis tried during the last twenty years, but one can scarcely consider the works of Marmorck or Maragliano as modern. Treatment by tuberculin is discussed; apparently the author has faith in its value and believes in the von Pirquet skin test. On the other hand, little mention is made of the value of artificial pneumothorax in treatment.

Treatment by drugs, however, is dealt with more satisfactorily and good advice is given.

Although the book is written by an Indian authority, only slight mention is made of the particular problems regarding tuberculosis in respect to India.

The book contains little that is not found in any ordinary student's text book of medicine, and while being far from up to date, it sets out clearly and in an easily readable manner the main facts that a student should know concerning tuberculosis and its treatment.

HÆMATOLOGY.

PROFESSOR VICTOR SCHILLING is a renowned hæmatologist and it is disappointing that his book, "The Blood Picture," as translated and edited by R. B. H. Gradwohl, does not come up to expectations.[2] American spelling, obscurity of the text and cumbersome style are displeasing features. Part I, on technique, is not illuminating, except on the subject of Schilling's thick drop method, guttadiaphot and hæmogram. The thick drop method as used in tropical medicine for the rapid detection of malarial and other parasites has been given an important rôle in ordinary routine blood examinations. By these means Schilling demonstrates the presence and relative number of immature red cells, stippled cells and eosinophiles. The guttadiaphot is an obviously crude test in which colour effects of "two drops of venous blood applied to three strips of paper of different colour" are observed and deductions drawn as to the presence of functional or organic disease and the severity thereof. The hæmogram is the tabulated routine blood examination as devised by Schilling.

The author is satisfied with Fonio's method for counting blood platelets and the Tallquist and Sahli methods for

[1] "Handbook on Tuberculosis," by B. S. Kanga, M.D., D.P.H.; 1930. London: John Bale, Sons and Danielsson Limited. Crown 8vo., pp. 158, with illustrations. Price: 5s. net.

[2] "The Blood Picture and its Clinical Significance (Including Tropical Diseases)," by Professor Dr. Victor Schilling; Translated and Edited by R. B. H. Gradwohl, M.D.; 1929. St. Louis: The C. V. Mosby Company. Royal 8vo., pp. 408, with illustrations. Price: $10.00 net.

hæmoglobin estimation are apparently above criticism. A lengthy, vague dissertation on the sedimentation test is not enlightening.

Part II is entitled "Theory, Morphology and Division of the Blood Picture." Anæmias are considered from the regenerative and degenerative viewpoint and although this conception is a good one, the classification of all anæmias under these headings becomes rather involved. Schilling's hypothesis that platelets are derived from the nuclei of immature red cells cannot be upheld in view of the well substantiated theory of their megalokaryocytic origin. The white blood cells are considered in great detail and the changes manifest in various diseases are dealt with comprehensively. Unnecessary space is taken up with an indictment of Arneth who apparently based his recently modified classification of leucocytes on Schilling's formula and did not have the grace to acknowledge his authority. Hodgkin's disease receives scant consideration and, strangely enough, is classified as an aleuchæmia. The section concludes with a description of the blood picture in children.

In Part III the application of the hæmogram to clinical medicine is considered. The hæmogram is based on Schilling's thick drop method and his classification of myeloid cells into unsegmented myelocytes, juvenile and "stab" metamyelocytes and segmented polymorphonuclear cells. An increase in the total of these unsegmented cells above the normal figure of 4% is termed a nuclear shift. With the aid of numerous case reports the significance of the hæmogram in diagnosis and prognosis, particularly in obscure infective conditions, is demonstrated. A section on foreign bodies, parasites *et cetera* in the blood picture could be more lucid.

The concluding chapter is a collection of one hundred case histories with hæmograms attached.

The book is well printed on art paper and, with the exception of the photomicrographs, the illustrations, particularly the coloured plates, are good.

PROGRESS IN PÆDIATRICS.

"PEDIATRICS" (The Practical Medicine Series), edited by I. A. Abt with the collaboration of A. F. Abt, consists of a collection of summaries of articles on diseases of children. These articles have appeared in medical journals published in various countries during the last year.[1] The editors have concentrated on material which, in their opinion, points to some advance in the subject under consideration. The summaries have been skilfully compiled so that the reading of them is a pleasure; a reference to the original article is given with each, the editors adding a footnote to those which they deem especially worthy of praise.

The surgical side of diseases of children is poorly represented, the book being one for the physician. A tribute to the late Professor Clemens von Pirquet forms a most appropriate introduction and a photograph of him occupies the front page. There are a few illustrations, some of which are poorly reproduced. Misprints are rather frequent, eighteen being noticed during perusal of the volume.

The book is of a convenient size and the print is easily legible. It can be confidently recommended to those interested in the study of disease in children. It contains a large amount of valuable information and should be useful for purpose of reference. An efficient index is provided. One reads the book with a feeling of respect for the large amount of work which must have been undertaken in its compilation.

ANIMALS AND HUMAN DISEASE.

THE volume entitled "Diseases Transmitted from Animals to Man" has been designed by the author, Dr. Thomas G. Hull, to fill the need of correlation between several groups of workers: the veterinarian, the physician, the laboratorian and the health official.[1]

In this book of three hundred and fifty pages the chief diseases of importance in the above aspect have been described. A brief historical review of each disease has been included and at the end of every chapter is a short bibliography.

The limited size of this book and the number of diseases considered have prevented any detailed discussion of bacteriological and pathological aspects. It is unfortunate that recent work on the probable virus origin of psittacosis was not available for inclusion.

The sections dealing with animal parasites are restricted for the most part to those forms which occur in North America. There is a useful discussion of trichinosis, but the accounts of some of the other infestations are not entirely satisfactory. No mention is made of fresh water crustacea in the account of the life history of *Diphyllobothrium latum*, and on page 301 the erroneous statement is made that rats become infected with *Hymenolepis diminuta* by swallowing the eggs of this tapeworm.

A number of illustrations and tables add interest to this work.

Notes on Books, Current Journals and New Appliances.

WORK AT THE MAYO CLINIC.

VOLUME XXI of the "Collected Papers of the Mayo Clinic and the Mayo Foundation" for 1929 is to hand.[2] It bears the date of publication, May, 1930. This volume is a valuable one and needs no introduction to medical practitioners. In the foreword it is explained that an increasing proportion of the papers published from the Mayo Clinic deals with questions of pure science. In the year 1929 there were 471 papers from which a selection could be made for publication in one volume. An attempt has been made to select material which may prove of most service to the general practitioner, diagnostician and general surgeon. Of the 471 papers ninety have been printed in full, twenty-three are abridged, sixty-eight are abstracted and 290 references only are given.

Among the papers which may be mentioned as of particular interest to the general practitioner is one on dyspepsia by Donald C. Balfour. He shows that dyspepsia is a symptom and not a disease and that familiarity with the physiological processes of digestion in health and disease is necessary before the different types can be properly understood. Balfour also writes on recurrent peptic ulcer. The paper by F. A. Willius on digitalis in clinical medicine is useful and physicians interested in electrocardiography will find contributions which appeal to them, from the pens of A. R. Barnes and M. B. Whitten. Helmholtz's paper on experimental pyelitis and its relationship to urinary infection in the infant is of importance to pædiatrists. Albert M. Snell describes some recent advances in endocrinology. S. F. Haines and W. M. Boothby discuss oxygen treatment with special reference to treatment of complications incident to goitre. J. de J. Pemberton deals with the surgical treatment of goitre. B. R. Kirklin and L. S. Faust discuss the radiological aspect of pulmonary infarction. W. H. Feldman has studied the morphological reactions following the production of experimental tuberculosis by intracerebral inoculation. L. G. Rowntree contributes an article on the selection of diuretics. E. Starr Judd deals with the surgery of the biliary tract.

The articles mentioned serve to illustrate the wide range of subjects covered in this year book. There is something to interest all medical practitioners.

[1] "Practical Medicine Series: Pediatrics," Edited by Isaac A. Abt, M.D., 1929. Chicago: The Year Book Publishers. Crown 8vo., pp. 448. Price: $2.25 net.

[1] "Diseases Transmitted from Animals to Man," by Thomas G. Hull; 1930. London: Baillière, Tindall and Cox. Royal 8vo., pp. 350, with illustrations. Price: 25s. net.

[2] "Collected Papers of the Mayo Clinic and the Mayo Foundation," Edited by Mrs. M. H. Mellish, Richard M. Hewitt, B.A., M.A., M.D., and Mildred A. Felker, B.S. Volume XXI, 1929; Published May, 1930. London and Philadelphia: W. B. Saunders Company; Melbourne: James Little. Royal 8vo., pp. 1197, with illustrations. Price: 63s. net.

The Medical Journal of Australia

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All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

TAXATION AND MEDICAMENTS.

THE new tariff imposed by the Commonwealth Government on certain drugs, sera and other laboratory products has caused much anxiety to medical practitioners and to hospital administrators. They realize that they will be seriously handicapped in their treatment of sick persons, a large number of whom will not be able to pay the additional cost imposed by the duty. It is patent to all who have devoted any study to the economic situation, that drastic economies are necessary, that every member of the community has to bear his share of the burden and that some time will necessarily elapse before stabilization on a new basis is possible—this apart altogether from any political views that may be held. The imposition of customs duties on medicaments of all kinds involves a basic principle. This principle should have been asserted long ago and medical practitioners should have asserted it again and again. It has been neglected until the last straw has been added—a straw that promises well nigh to break the camel's back. The principle at issue is that medicaments of all kinds should always be freely available without let and hindrance and within the purchasing power of all members of the community; for those who have no money with which to buy, the medicaments should be available at institutions charged with their care and treatment. The natural corollary of this is that medical practitioners should not be blocked in any way in the choice of therapeutic preparations. No two persons react in exactly the same way to any medicament. The human constitution, unlike drugs, cannot be standardized; the reaction can seldom be foretold with certainty. Were it otherwise, the practice of medicine would be a rule of thumb business.

There is another side to the picture. The duties have been imposed in an attempt to balance the ledger, to compel the use of Australian products, to give employment to Australians and to help Australia to be self-supporting. Medical practitioners will surely agree that these objectives should be sought. Many doctors prejudge the Australian product—they declare the imported product to be better and the home-made preparation inferior, without having given the latter adequate trial. Some, maybe, are so prejudiced that they will not give the home product a trial at all. It must be realized that at the present time it is necessary to give Australian products every chance; they should be used, not once nor twice, but in an honest attempt to assess their value. No one will complain if a medical practitioner after honestly trying to use an Australian preparation for an individual patient, discards it in favour of an imported article because the latter is more suitable for that person. There is another point to be considered. There are in the Commonwealth laboratories owned and controlled by the Government at which therapeutic preparations are made. If the output of these laboratories is increased, the price of preparations can be reduced; if medical practitioners do not use the products of these laboratories and if the ledgers of the laboratories are not balanced, medical practitioners, together with other members of the community, will have to make good the deficiency.

The conclusion of the matter is this. Therapeutic preparations must be admitted into the country free of duty so that the sick people of the Commonwealth will not be penalized and so that medical practitioners will not be handicapped in their therapeutic endeavours. On the other hand, if this is done (and if it is not done) medical practitioners must make an honest attempt to use the medica-

ments prepared in their own country. If, having made the attempt, they feel themselves compelled of honesty to use imported articles, there will be no cause for governmental complaint. In this way the best and most suitable preparations will be used and sick people will receive what they are entitled to—adequate treatment.

Current Comment.

SINUS ARRHYTHMIA.

As a result of the teachings of Sir James Mackenzie sinus arrhythmia is regarded generally as a normal condition. No doubt on this account its investigation has been neglected rather within recent years, so that nothing further has been learned regarding its cause or significance. That it is due to fluctuations in degree of stimulation to the afferent fibres of the vagus is generally conceded, but there has been no satisfactory explanation as to why it should be manifested in some apparently healthy hearts and not in others.

Mackenzie referred to sinus arrhythmia as the "youthful type of irregularity"; he considered it to be significant of a healthy heart, and he suggested that the appearance of sinus arrhythmia after the subsidence of an acute infection was indicative of cardiac recovery. He admitted, however, that his views could only be accepted *in toto* if confirmed by careful observations over a period of many years.

In 1921 Wedd stated that sinus arrhythmia may actually be a manifestation of cardiac disease, and he pointed out that such diseased condition of heart or aorta may possibly provide the vagal stimulation necessary for the production of the arrhythmia.

James M. Faulkner has recently published a paper in which he discusses the occurrence of sinus arrhythmia in cardiac disease of old people.[1] He reports four cases. The youngest of his patients was sixty-one years of age and the oldest eighty-seven. All of them were said to have had arteriosclerosis, though in no instance was the blood pressure raised above normal limits. There was evidence of cardiac disease in all instances, partial heart block was present in two instances and intraventricular block in the other two. In addition to the cardio-vascular disorder there was also in each case evidence of other organic disease. One patient had carcinoma of the prostate, one had bronchial asthma and two others had bronchitis. In one instance it was shown that the arrhythmia bore no relation to respiration, in two others this aspect was not especially investigated, while in the fourth the rate was accelerated during inspiration and decelerated during expiration. In this latter instance increase in the pulse rate from 48 to 60 per minute lessened, but did not abolish the arrhythmia; in one other instance increase of rate from 60 to 80 per minute had no influence on the arrhythmia.

One patient who suffered from carcinoma of prostate and general anasarca, died shortly after admission to hospital; one improved with rest and his arrhythmia disappeared; one gave evidence of improvement with regard to his cardiac condition, though his arrhythmia persisted; no mention is made of the progress of the fourth beyond the fact that his arrhythmia persisted. The case reports are lacking in some essential details. For example, no mention is made of the effect of rest and treatment on the pulse rate, nor is the presence or absence of fever noted.

According to Faulkner a comparison of the records of a series of patients over fifty years of age who had sinus arrhythmia, with records of one hundred whose rhythm was normal, revealed the fact that 57% of the former and 85% of the latter had evidence of organic disease of the heart. His figures, however, are not carefully set out and are unconvincing. Further, sinus arrhythmia is often not strikingly apparent and might frequently be overlooked in the absence of symptoms calling special attention to investigation of the cardio-vascular system.

Sinus arrhythmia is sometimes confused with auricular fibrillation in elderly people, and there is no doubt that it occurs much more frequently than is generally believed. Though Faulkner does not provide a very strong argument in favour of the pathological significance of the condition, he certainly shows that it may be associated with organic heart disease in the aged and that it therefore merits further investigation.

[1] *American Journal of the Medical Sciences*, July, 1930.

WHEAT GERM AND VITAMIN B.

Not only is the list of vitamins augmented so frequently that the alphabet is rapidly becoming depleted in providing a system of nomenclature, but also additional properties are being constantly ascribed to those vitamins already known. These should be accepted with caution, as in many instances the properties might just as readily be ascribed to some other food constituent.

Agnes Fay Morgan and Margaret M. Barry in a recent report place a high value on vitamin *B* as an adjuvant to growth in children.[1] They divided into two groups a number of underweight school children aged eleven to thirteen years. The children of one group were allowed to continue with their usual diet, which included two rolls of white bread weighing each 42·5 grammes at luncheon. The children of the other group were given rolls of the same size, but composed of white flour and wheat germ in the proportions of 50% of each. It has been remarked that the oil contained in the germ leaves an unpleasant after taste, but Morgan and Barry did not find this so in their experiments. On the contrary the food appeared to be very palatable.

[1] *American Journal of Diseases of Children*, May, 1930.

The children receiving wheat germ increased in height and weight to a considerably greater extent over a given period than did those of the control group. The groups were then reversed so that the control group became the experimental group and *vice versa*, and observations were repeated. The children of the control group were again outstripped as regards weight and height increase by those receiving wheat germ. Morgan and Barry believe that the beneficial effects of the wheat germ were due to its vitamin *B* content.

Some authors have declared that the lack of appetite seen so commonly among modern children is due to a lack of vitamin *B* in the diet. Certainly it has been shown that foods containing vitamin *B*, whether by virtue of the presence of that vitamin or some other vitamin or substance, do stimulate the appetite. Mottram, Cramer and Drew also expressed the opinion that the presence of vitamins *A* and *B*, especially the latter, aided the absorption of fat from the intestinal tract. McCollum and Simmonds believe that the marasmus resulting from a deficiency of vitamin *B* is due to impaired absorption and assimilation from the intestines. By stimulation of appetite and promotion of efficient absorption the assimilation of wheat germ which is extremely rich in vitamin *B*, might then be expected to result in increased rapidity of growth.

Modern tendency is more and more towards over-preparation of foods, with consequent destruction or loss of their natural properties. The addition of wheat germ to white flour is a useful and handy method of introducing into the diet vitamin *B*—and incidentally vitamins *A*, *E*, *F* and *G*—in a concentrated and palatable form, but the assertion that its good effects are due solely to its vitamin content should not be unreservedly accepted.

LESIONS OF THE HEPATIC ARTERY.

THE hepatic artery may be the seat of a variety of lesions. It may be affected by aneurysm or be the site of accidental injury; it may be involved in vascular conditions and infections. Bernard Seligman has recently reported two cases of interest.[1] In both thrombosis of the vessel occurred. In one the condition was chronic and was probably due to atherosclerosis, as the patient suffered from *thrombo-angiitis obliterans*. The main artery was involved and no infarct was present. Death was due to bronchopneumonia. In the second instance the condition was acute and probably secondary to infection of the biliary tract; the portal and hepatic veins were involved, there was a hæmorrhagic infarct in the liver and there was a thrombus at the bifurcation of the hepatic artery, the thrombus extended into the liver. Seligman does not discuss the metabolic changes in these cases and he concludes that the degree of liver injury following occlusion of the hepatic artery depends partly upon the site of occlusion and partly upon the extent of the collateral circulation.

These cases may be considered in conjunction with some experimental work carried out by G. R. Cameron and B. T. Mayes.[1] These authors carried out their investigations on rabbits. They conclude that the result of occluding the hepatic artery or its divisions depends on the anatomical arrangement of the vessels; this presents considerable variations. In man the dual nature of the hepatic arterial circulation (the main arterial pathway and the collateral circulation) is seen in its most highly developed form; in the majority of cases in which obstruction of the hepatic artery has occurred, very little disturbance of hepatic function has resulted. There is great difference between experimental procedures and conditions present in man. In the former the obliteration is instantaneous; it is in marked contrast with that associated with the slow development of an aneurysm or the tying of the artery for cure of an aneurysm. In Seligman's first case occlusion of the artery was of slow development and death was due to an extrahepatic cause. The calling into action of an efficient collateral circulation requires time. Thus the hepatic artery is not an end artery, unless an end artery is defined functionally as one whose occlusion leads to an infarct. An infarct may arise not because the actual flow of blood is stopped, but because the supply of oxygen is deficient. Cameron and Mayes point out that occlusion of the hepatic artery results in necrosis of liver tissue and occlusion of the portal vein in atrophy. In the one there is a true degeneration of hepatic cells, in the other there is no obvious degenerative change, but an orderly reduction of the lobule constituents.

[1] *The American Journal of the Medical Sciences*, May, 1930.

[1] *The Journal of Pathology and Bacteriology*, July, 1930.

PRIMARY EXAMINATION FOR THE FELLOWSHIP OF THE ROYAL COLLEGE OF SURGEONS.

IN a recent issue reference was made to arrangements that had been made between the College of Surgeons of Australasia and the Royal College of Surgeons of England whereby the primary examination for the Fellowship of the Royal College of Surgeons was to be held in Australia next year. It was stated that the examination would take place provided twenty-five candidates presented themselves. The Council of the Royal College of Surgeons has recognized the desirability of making definite arrangements and has resolved that the examination is to be held in August or September, 1931, whatever the number of candidates may be. Up to the present time more than twenty applications have been made by prospective candidates. It is hoped that the decision to hold the examination will result in further applications being made. Extracts from the regulations dealing with the examination were published in THE MEDICAL JOURNAL OF AUSTRALIA of July 12, 1930. Further information may be obtained from the Honorary Secretary of the College of Surgeons of Australasia, 6, Collins Street, Melbourne.

Abstracts from Current Medical Literature.

SURGERY.

Appendicitis.

D. P. D. WILKIE (*The Canadian Medical Association Journal*, March, 1930) deplores the faulty understanding and teaching of the pathology of acute affections of the appendix. He defines acute inflammation of the wall and acute obstruction of the appendiceal lumen. The former he calls acute appendicitis and the latter acute appendicular obstruction. Acute appendicitis probably follows on a blood-borne infection frequently being associated with tonsillitis. The chief ill effect of this condition is stenosis of the lumen, which may be followed by acute appendicular obstruction. Acute appendicular obstruction is associated with an increased tension in the organ which may undergo gangrene, resulting in rupture. Clinically acute appendicitis is associated with malaise, nausea and vague abdominal pain, becoming more or less localized in the right side. There may be a rise of temperature and some loss of appetite. Symptoms gradually abate at the end of the second or third day. If operation is performed in this condition, a red, congested and œdematous appendix will be found. In acute appendicular obstruction a definite clinical picture is found, suggestive rather of internal strangulation than of an inflammatory condition. There is intense pain, vomiting and pallor. At the onset the temperature may be normal for the first few hours of the attack and the pulse may not rise until gangrene has commenced. Rigidity and tenderness are always to be elicited.

Cholecystitis.

A. J. WALTON (*The Lancet*, February 15, 1930) in an address before the Manchester Surgical Association on "Some Modern Aspects of Cholecystitis and Cholelithiasis" summarizes his findings in a series of 574 cases. The disease is more common in females (78%). The majority of calculi are largely formed by cholesterol and there is a small group which consists of a pure pigment calcium. It is this type of stone which is commonly found in acholuric jaundice. In this disease this type of stone continues to be formed in the ducts, even if cholecystectomy has been performed, unless the spleen has been removed. Chronic inflammatory changes in the gall bladder are responsible for the formation of the other varieties of calculi. In many cases the clinical history dates back to an infection. This has been known for many years in association with enteric fever, where removal of the gall bladder has caused the patient to cease being a carrier of *Bacillus typhosus*. The observation of Wilkie and Illingworth that organisms are more common in the wall of the gall bladder is an argument against the possibility of ascending infection from the intestines. Graham has shown that in most cases of cholecystitis there is an adjacent hepatitis. Of late years it is becoming widely appreciated that gall bladder symptoms, especially in their early stages, are often associated with other evidence of general infection, such as pyelitis, tonsillitis, dental sepsis and gastro-intestinal disturbances. Probably a cholecystitis is one late result of a mild general septicæmia. The author always drains the stump of the cystic duct following cholecystectomy. He thinks this is rendered necessary by the opening of many small bile ducts in the gall bladder bed.

JOHN W. DIXON (*Pennsylvania Medical Journal*, March, 1930) discusses the treatment of cholecystitis. Before any treatment can be effective a diagnosis is essential. Cholecystography is the most reliable diagnostic aid. Some patients in whom chronic cholecystitis was diagnosed, experienced relief of symptoms following cholecystectomy, although at operation no pathological change was detected. The return of symptoms is frequently due to the presence of adhesions following inflammation or operation. Drainage produces some adhesions that may be crippling. Eighty-eight wounds after cholecystectomy were closed without drainage; it was employed only when there had been injury to the liver or soiling of the peritoneum with bile. In one patient who underwent a second operation, a stone was found in the common duct having a linen ligature in its centre. Following some deaths in the series, the author now invariably uses drainage after cholecystectomy. He concludes that soiling of the peritoneum at the time of operation is the most frequent origin of post-operative morbidity.

Traumatic Asphyxia.

W. R. LAIRD AND M. C. BORMAN (*Surgery, Gynecology and Obstetrics*, March, 1930) state that traumatic asphyxia was probably first described by Ollivier, of Anvers, in 1837; the subsequent history of the literature is discussed. Besides accidents that produce panic in large numbers of people, the industrial age has begun to claim traumatic asphyxia victims. Compression by elevators, cranes, steam shovels, street cars and wagon wheels may be mentioned. Mine accidents have caused cases. Statistics suggest that the condition is relatively rare. The cyanosis noted in this condition is probably essentially due to capillary and venous dilatation and engorgement as revealed by histological studies and the recently reported studies of Goldschmidt and Light who have shown that cyanosis may be produced without change in the oxygen content of the blood. For the sake of clarity and accuracy it is suggested that the term "traumatic asphyxia" be applied to patients in whom there has been squeezing compression of the chest and upper part of the abdomen with cessation of respiration for an abnormal length of time, with resulting cyanosis, subconjunctival hæmorrhages and the typical syndrome. It is suggested that local cyanosis, occurring, for example, in an extremity following local trauma or pressure, be called "traumatic cyanosis." The rarely observed cyanosis developing in the face, neck and upper part of the chest during an attack of *grand mal* should be termed "epileptic cyanosis." The probability of associated injuries to the abdominal and intrathoracic viscera should always be remembered. Unsuspected multiple bone fractures, especially fractured vertebræ, may be associated with the condition and may remain undetected in patients who recover, unless thorough X ray study of the bony framework be performed. The invariable subconjunctival hæmorrhage noted in the condition has a peculiar lozenge or wedge-shaped distribution, due probably to lack of suporting tissues. Some recent cases are reported in detail.

Duodenal Diverticulosis.

P. N. B. ODGERS (*The British Journal of Surgery*, April, 1930) discusses duodenal diverticulosis. Different observers have attempted to divide these diverticula into groups either according to their appearance into "true" and "false," or according to their supposed origin into congenital and acquired. The following classification is suggested as being at once more comprehensive and less committal: (i) Primary in which there is no obvious cause for their appearance (this would roughly correspond to the "false" group of most, or the congenital group of some authors); (ii) secondary in which there is some cause for their production, such, for instance, as a duodenal ulcer, old or recent, in their neighbourhood or the traction of adhesions from neighbouring viscera. This is the "true" or acquired group of different previous writers. Further, there is a third small group of pouches which must be differentiated from either of the above and which are due to dilatation of Vater's papilla or possibly of the bowel wall surrounding it. In the great majority of cases these primary diverticula are found as empty sacs, lying in a bed of areolar tissue in relation to the head of the pancreas. They probably owe their comparative immunity from inflammation to: (i) The sterility of the duodenal contents, (ii) their retroperitoneal situation which may allow of their easy distension (Greder), and (iii) the dependent position of their opening into the bowel, this opening, while of varying size, being usually sufficient to insure the easy emptying of their contents. These primary diverticula cause mechanical effects of a distended diverticulum, diverticulitis, peridiverticulitis, duodenitis, cholangitis, gall stones, acute pancreatitis, chronic pancreatitis and carcinoma. There are

no certain symptoms or signs which are pathognomonic of these pouches. Bensaude has suggested five predominant groups of symptoms which are: vague digestive disturbances, the ulcer type, incessant vomiting, cholangitis type, pancreatitis. The medical treatment which Spriggs has described, aims at three things. In the first place, by means of X rays the best position for the patient to assume in order to allow of easy emptying of the diverticulum is determined and he is advised to adopt this after meals. Secondly, an attempt is made to keep the bowel and the pouch lubricated and disinfected by means of liquid paraffin and "Kerol" capsules. Lastly, attention is paid to the digestion and everything is done to tone up the whole alimentary canal. These methods seem to have met with a great measure of success. Case, on the other hand, does not consider that any form of non-surgical treatment will do any good. Excision of the pouch, first done by Forsell and Key in 1915, is the ideal treatment.

Common Duct Stones of Liver Origin.

KENELM H. DIGBY (*The British Journal of Surgery*, April, 1930) writes about the common duct stones of liver origin. When a stone is found in the common bile duct in a European or American woman it is nearly always of small or moderate size; such stones certainly originate in the gall bladder. Large stones in the gall bladder may ulcerate into the duodenum or transverse colon. Smaller stones may pass along the cystic duct or occasionally ulcerate into the common duct. Before doing so they have remained in the gall bladder so long and damaged it to such an extent that this organ has become cicatricially contracted. Hence the well known generalization of Courvoisier that distension of a gall bladder associated with chronic jaundice is not due to gall stones. As the gall bladder is diseased, it should always be removed. In Chinese patients, as seen in Hong Kong, there is an entirely different picture. Stones in the common duct usually originate in the liver. When they reach the common duct they grow to a remarkable size and lead to distension of the gall bladder, thus breaking Courvoisier's law. They produce a striking and unmistakable syndrome. Excision of the gall bladder appears to be contraindicated. Though this is the general rule, gall stones do very occasionally form in the Hong Kong Chinese gall bladder. Intrahepatic stone formation occurs as a rarity amongst Europeans. The sufferers from the condition here reported were all adults; four were males, four females. In all these there was great enlargement of the common bile and the common hepatic ducts, up to a diameter of 2·5 centimetres (one inch). In every case the gall bladder was much distended and the liver was enlarged. On *post mortem* examination the intrahepatic ducts showed dilatation when the liver was cut across. In all eight cases, however, stones were found in the common ducts. These appeared to be either very numerous and only moderately large or few in number, one or more, and enormous in size. These common duct stones, though definite in shape and often faceted, were soft enough to be crushed between finger and thumb. When dried, the outer laminæ tended to flake off in patches. They appeared to consist chiefly of bile pigments. Both cirrhosis of the liver and malignant disease of the liver are commoner in South China than in Europe and the liver fluke has been put forward as a possible explanation. If left alone, these patients probably all die from the condition sooner or later. Early operation is therefore indicated; but attacks frequently subside for the time being and, if the general condition is good and the attacks appear to be subsiding, it may be well to wait till jaundice has passed, for reactionary hæmorrhage was a feature in two fatal operation cases. Intramuscular injections of calcium chloride and subcutaneous injections of hæmostatic serum are indicated both before and after operation. The immediate surgical indication is choledochostomy with removal of the stones. The stones causing intermittent obstruction and back pressure must be taken away; the infected ducts must be freely drained for several weeks.

Acute Appendicitis in Old Age.

H. FLÖRCKEN AND R. RIEMANN (*Deutsche Medizinische Wochenschrift*, March 14, 1930) relate their experiences with appendicitis in patients over fifty years of age. There were 145 patients in a series of 1,620 (8·9%). They noted no difference between rectal and axillary temperatures, as is so typical of younger people. The pulse rate averaged from 80 to 90. Vomiting was not a prominent symptom, but all who vomited had a diffuse suppurative peritonitis. The mortality was 12%, due mainly to peritonitis. Pulmonary embolism was the next most frequent cause of death. Massive infarction was not observed, although pulmonary œdema was associated with smaller areas of consolidation. The usual symptoms were: Irregular bowel evacuation, feeling of abdominal distension, tenderness in the appendix region and an increase in the pulse rate. They preferred lumbar anæsthesia or gas and oxygen to a general anæsthetic with ether.

The Diagnosis of Tumours of the Spinal Cord.

M. NONNE (*Deutsche Medizinische Wochenschrift*, September 13, 1929) complains that tumours of the spinal cord causing compression myelitis are frequently concealed under the diagnosis of multiple sclerosis. He points out that posterior sclerosis of the cord is extremely rare, whereas cord tumours without pains are relatively frequent and the absence of pain does not preclude the possibility of tumour. He urges the suboccipital use of "Lipiodol" injections followed by X ray examination in such cases or at any rate, if that be not favoured, at least the application of the Queckenstedt test and comparative examination of cerebro-spinal fluid from both the suboccipital and lumbar regions. The diagnosis is usually missed because chronic dorsal myelitis is regarded as a disease *sui generis* instead of a symptom, whilst hysteria is often diagnosed in neuropathic individuals. Pains limited to constant segmental areas of skin, localized and limited hyperæsthesia, atrophic paresis and tenderness on pressure over the vertebral spines are regarded as important signs of tumour. Tumours of the *conus medullaris* and *cauda equina* are frequently concealed under the diagnosis of rheumatism, sciatica, tabes, cystitis, hysteria and even infective myelitis from septic teeth or pyorrhœa; but such mistakes should be avoided when it is found that sensation is absent in the skin first to the fifth sacral segments and that the anal and *tendo Achillis* reflexes cannot be elicited.

The "Dry" Treatment of Minor Surgical Lesions.

WALTER BRANDESKY (*Wiener Medizinische Wochenschrift*, February 8, 1930) describes a method of treating small wounds, ulcers, burns, blisters *et cetera* in out-patients, whereby they are kept dry and exposed to the air, yet protected against infection. They were originally treated with a fine dusting powder, "Dermatol" and now with 1% "Sozoiodol hygrargyrum." No bandages are needed and the lesion heals rapidly under a dry crust. The author gives the organic chemical formula for "Sozoiodol" which is a derivative of paraphenol sulphuric acid, and it is available commercially as the sodium, potassium and mercury salts. The last named is not readily soluble in water, but can be made soluble by the addition of 0·75% saline solution. The first applications to the lesions, especially in eczema or other excoriations, are incorporated in a few layers of open meshed gauze or muslin and left on for a few days, till crusted. This encourages epithelialization of the raw surfaces. The powder causes a burning, smarting pain for a short time following its application, up to two hours; the pain then disappears without further discomfort. Blisters must have the cuticle removed before the powder is applied. First and second degree burns respond excellently to this form of treatment, although in the latter the author advocates preliminary sedative treatment till the acute pain passes off before the application of "Sozoiodol." He concludes by stating how well ulcers and all forms of trophic nervous lesions, including frost bite, respond to "Sozoiodol" and by describing several illustrative cases in detail.

Special Articles on Diagnosis.

Contributed by Request.

X.

PULMONARY TUBERCULOSIS.

BEFORE we begin to discuss the questions involved in the diagnosis of pulmonary tuberculosis, it is necessary to reach some sort of agreement as to what we mean by this term. At the present juncture there is considerable confusion, both of thought and writing, because of the different standards set up by general practitioner, pathologist and radiologist respectively.

Under the Public Health Acts of the various Australian States a medical practitioner must notify to the public health authority the name and address of any one of his patients who in his opinion is suffering from pulmonary tuberculosis. But the standard of diagnosis generally accepted for such notification is the demonstration of tubercle bacilli in the sputum; for the main purpose of notification is to enable the health authorities to take the steps necessary to prevent an infectious individual being a menace to the health of others. At this stage the diagnosis is generally fairly simple. The presence of cough with or without pyrexia has led the individual to seek medical advice, examination reveals a certain loss of energy and weight, there are localized signs of an inflammatory or breaking down process in the upper parts of one or both lungs and the diagnosis is clinched by the examination of the sputum.

But with the growth in our knowledge of pulmonary tuberculosis since these health acts were passed, we now seek to make the diagnosis, if possible, before the patient reaches this "open stage," both for the sake of himself and of those in contact with him. It is wrong nowadays for us to make no attempt to diagnose an active pulmonary tuberculosis before it reaches this stage, even though for various reasons we may fail in the attempt in certain cases.

Going to the other extreme, we might diagnose pulmonary tuberculosis in anyone who reacts to tuberculin, or who, when radiologically examined, shows shadows in his chest of lesions characteristic of tuberculous infection. Yet this would be just as wrong. For he may be infected, yet not suffering from tuberculous disease, much less from pulmonary disease; he may have been infected and diseased, yet at this particular time not be suffering from this particular disease.

The problem, then, in any given instance is a twofold one: (i) Is the patient infected with tuberculosis? (ii) Are his symptoms directly or indirectly due to an active tuberculous process?

In solving our problem we have four main lines of approach, two of them comparatively new, two of them old standing, but magnified in importance by recent additions to our knowledge.

The History.

Our clearer appreciation of the reactions which follow the invasion of the body by the tubercle bacillus should make our history-taking more purposive and intelligent. The fact that most of our patients have undergone one infection in early life, that this primary focus has affected the reaction of the body to any subsequent reinfection, that intercurrent infections or physical or social strains have also affected the progress of such infection, should reflect itself in the history of the individual. The older he is, the greater the likelihood of some such past outcrop of symptoms. Our inquiries should be purposely directed along such lines for positive or negative evidence. Thus a family history of tuberculosis is important only in that it increases the liability to gross infection in infancy or childhood and our inquiries should be directed to this point rather than to an enumeration of relatives more or less distant in consanguinity or habitat. Social history is mainly of importance in the same way; nor should a vague occupational term like "labourer" be accepted without inquiry as to possible dustiness of occupation or unhealthy living conditions. A period of unexplained ill health or of pyrexia of obscure causation in the past history should always be carefully investigated, while, of course, any mention of previous hæmoptysis or pleurisy suggests previous infiltration or exudative process.

The Physical Examination.

Physical examination has become both more extensive and intensive, but we dogmatize less about the specific significance of any one single sign. In those patients with suspected early disease and doubtful signs in the chest, the supposed importance of prolonged expiratory murmur at the right apex or cog-wheel inspiration elsewhere has diminished, unless these are accompanied by other signs. Apical crepitations on coughing remains one of our most valued positive signs, especially if associated with slightly diminished movement and flattening of that side of the chest. We have learned the importance in certain instances of a diminution of Krong's area of resonance or of increased paravertebral dulness. But we pin our faith to no one sign, for we have learned that any of them may occur in other conditions than pulmonary tuberculosis. If there is a cough in these cases, examination of the sputum must never be omitted, but a negative result, even on more than one occasion, does not rule out pulmonary tuberculosis. Rather we rely on repeated physical examination for transient adventitiæ, on regular weighing at stated intervals, on the patient recording for a week or two his temperature in the evening or after exertion, and on a leucopenia in association with a rise of temperature.

In a patient with more definite signs of some pathological condition in the chest, we still regard the occurrence of such signs in one upper lobe as strongly suggestive of a tuberculous process, but even such signs in the upper lobe as dulness, bronchial breathing and moist adventitiæ have proved on occasion to be due to hydatid of the lung or a lobar pneumonia with resolution delayed owing to an interlobar empyema. It is wise to remember that a unilateral bronchitis is unknown; on the other hand, in adults râles in one lower lobe will persist for a long time in post-influenzal conditions without any tuberculous infection. We do meet at times a patient with basal tuberculosis, especially in adults. We should always beware of the possibility of a tuberculous basis behind a long-standing bronchitis in old people; on the other hand, in childhood the presence of râles more often betokens a non-tuberculous process and, if confined to the lower part of one lung, often signifies a bronchiectasis. In all these cases the absence of tubercle bacilli from the sputum should make us pause. In all these cases also careful search must be made for evidence of past or present tuberculous disease in other parts of the body. Quite recently when an appendicectomy for an acute attack of abdominal pain was followed by pneumonia a few days later, the persistence of the basal signs some weeks later seemed explicable on the grounds of delayed resolution and this was apparently confirmed by the absence of tubercle bacilli from the sputum, yet the recurrence of acute attacks of abdominal pain with some general body wasting led to investigation of the fæces in which tubercle bacilli were demonstrated and the lung condition was found to be tuberculous in nature.

The Various Cutaneous Tuberculin Tests.

von Pirquet's test is too well known to need mention. But of recent years it has to a certain extent been replaced by the intradermal test in which the skin is not scratched, but 0·1 cubic centimetre of a one in 1,000 dilution of Koch's old tuberculin is injected intracutaneously (not subcutaneously), a very fine needle being used. The flexor surface of the forearm is usually selected, the skin being cleansed first with ether. The injection should produce a fine wheal at the time. In forty-eight hours, if the reaction is positive, an erythematous area with slight thickening will be found surrounding the site of injection, varying in intensity and area according to the reaction. This

gradually fades, but in certain cases leaves a brownish discoloration for a time. A positive reaction does not mean that the patient is necessarily suffering from tuberculosis, much less from pulmonary tuberculosis, only that he has at some time received a tuberculous infection. Before accepting a failure to react, it is well to make sure that the tuberculin used for the test is active. For this reason the dilution should always be fairly fresh. And it is also wise in those patients who do not react, to repeat the test with a stronger solution.

If the investigator is still in doubt or desirous of more direct proof of the suspected lesion being pulmonary, the subcutaneous method may be used. In this test 0·2 milligramme of old tuberculin is injected subcutaneously; if no reaction follows, then three days later one milligramme is injected. If no reaction follows this, three days later five milligrammes may be injected. A positive reaction produces: (i) a local reaction of redness and swelling at the site of injection, (ii) a general reaction of malaise and pyrexia, (iii) a focal reaction shown by some crepitations at the site of the pulmonary lesion. The focal reaction, if it occurs, is the only advantage this last possesses over the intradermal test, and while the dangers of this focal reaction have been exaggerated, it is well to proceed cautiously and use the weaker dilutions first.

Radiographic Methods.

Radiography is the only method of the four mentioned that is outside the personal use of the general practitioner, unless he has had some special training in radiography. As present day medical students now receive the rudiments of such training and as portable outfits capable of securing a good picture are increasing in number, it is probable that the use of this method will gradually become more general. Even so, it is well for the clinician to leave to the expert radiologist the taking of the picture in any patient where the diagnosis is in doubt. The findings of the clinician and the radiologist should then be discussed by the two of them in conference. In this way each brings an open mind and a definite contribution to the diagnosis. Granting all that is said as to the uncertainty inherent in X ray findings, there is no doubt as to their immense value in assisting to form a diagnosis.

1. In certain patients with definite physical signs in the chest they may reveal the presence of a hydatid or newgrowth, or even a foreign body or bronchiectasis.

2. In family contacts or patients with indefinite symptoms they may reveal shadows of more extensive infiltration than physical signs would suggest.

3. If a series be done at intervals, there may be noticed a lessening or increase of shadow that is important. These successive pictures are of value because they give a graphic record much easier to compare than one's notes or memory of physical signs.

4. If clinical findings and radiographic picture suggest the presence of bronchiectasis, this can be confirmed by "Lipiodol" injections with subsequent X ray examination.

Use of the Four Methods.

It will be seen that if we habitually rely on any one of these methods exclusively or disproportionately, we will frequently fall into error. On the other hand, all of them may be required in a doubtful case. The clinician, whether the family medical attendant or consultant, rightly insists that the diagnosis is not to be made in the laboratory or the dark room; but on the other hand he has no right to neglect the use of these other methods. The general practitioner who boasts of his ability to decide for or against pulmonary tuberculosis only by what he calls "clinical methods," is talking just as much nonsense as the radiographer who claims the right to make the diagnosis from his findings only. The art of the clinician consists in assessing the relative value of the different pieces of evidence that medical science affords him, and in passing judgement accordingly, and medical science, rightly understood, comprises all four methods.

It follows that these methods will be used to a different degree in different cases. For instance the diagnosis may have to be made: (i) In an examination for life insurance, (ii) in a family or other close contact, (iii) in a patient anxious about certain symptoms.

In the first case a satisfactory personal history and a thorough physical examination conjoined would suffice in most cases to decide against pulmonary tuberculosis—doubtful cases would only be deferred. In the second case one could not be content without a radiological examination and possibly a skin test with tuberculin and arrangements for further examinations at intervals. In the third case ordinary physical examination with examination of sputum might be quite sufficient to make a positive diagnosis, though in a less definite case more extended investigation would be necessary. The last mentioned class of patient is the most frequent and presents the most difficulties.

The importance of particular symptoms varies at different age periods. In childhood true pulmonary tuberculosis is not so frequent, glands and joints being more usually affected; hence, possibly, some cases of the much talked of hilar tuberculosis. Yet its possibility must never be overlooked, especially in a child with prolonged ill health or some pyrexia persisting after measles or whooping cough or bronchopneumonia. In the latter case, with basal signs, the condition is more likely bronchiectasis and this would be supported by repeated negative results of the examination of sputum for tubercle bacilli. In doubtful cases a history of family contact is important because of the large proportion of child contacts who show evidence of infection. In such cases the results of an intradermal tuberculin test have more significance than in later life.

In middle age the patient rather presents himself for unexplained failure in strength and energy which may or may not be accompanied by cough; in women at this age period the history frequently shows exhaustion from childbearing and lactation or, during the past year or two, from extra labour and privation owing to the husband being out of work. In men, occupation may play an irritating or enervating part or, more often than is supposed, there may be the history of a recent injury to the chest wall. At this age gross physical signs are generally obtainable and tubercle bacilli demonstrated in the sputum.

In older people the trouble is often concealed by the signs of bronchitis and many of the deaths registered as chronic bronchitis are really from pulmonary tuberculosis. Errors in diagnosis here arise rather from neglect to examine the sputum as a routine measure in every old person with cough and expectoration.

But it is in the youth and young adult that the question of diagnosis is most frequent and most important.

There should be no need to dwell on the importance of hæmoptysis except to reemphasize that no patient presenting himself on account of hæmoptysis should be released from observation till the above methods of examination have definitely proved the existence of another cause than tuberculosis for the hæmoptysis. In these young adults pleurisy with effusion without obvious cause is generally recognized as tuberculous in origin, yet some practitioners still fail to advise the patient of its meaning. A large number distinguish between the importance of serous pleurisy and "dry pleurisy," yet the latter is even more important as frequently being the first evidence of already active pulmonary tuberculosis. In the last month three instances have come under personal observation where a diagnosis of "dry pleurisy" had been made and the patient had simply been told to rest for a week. In one of them, a little later, cavitation was evident in both lungs on physical examination; in the second an X ray photograph showed an infiltration extending up to the apex of that lung; in the third tubercle bacilli were demonstrated on examination of the sputum. The sooner we all regard non-traumatic pleurisy as an invariable symptom of an underlying infection, generally tuberculous, the earlier will we diagnose pulmonary tuberculosis.

There remain those young adults with indefinite symptoms of ill health and probably indigestion, accompanied by loss of appetite, loss of vigour and loss of weight. Absence of physical signs may lead to a diagnosis of

neurasthenia, when the symptoms are really due to a tuberculous toxæmia that more detailed investigation would reveal. The symptoms may be ascribed to the after effects of an attack of "influenza" which was really the febrile reaction of an active tuberculous trouble. It is in these patients that the careful recording of evening temperature for a week or two is of value. In these also the subcutaneous tuberculin tests seem to me to find their most appropriate field, for the focal reaction, in addition to the other reactions, may direct attention to the local lesion.

Having said all this, I am reminded of the last meeting of our clinical section, at which the history was narrated of a young man who two years before had shown symptoms of ill health and loss of weight, without obvious physical signs in his chest, yet in whose case a radiogram revealed rather extensive shadows. He was sent away to the country for some months and regained health. A few weeks before our meeting his medical attendant had sent him up to the same physician because his general condition had gone back again, but still no obvious physical signs were demonstrable. A skiagram taken this time showed so much more extensive mottling than before that the physician had no hesitation in pronouncing it active pulmonary tuberculosis, in spite of the indefinite physical signs and the absence of tubercle bacilli from the sputum. The family thereupon asked for a third opinion. This consultant heard the history and saw the pictures and went down expecting to find a very sick man. To his surprise he could find no gross signs, constitutional or local, of active disease. An intracutaneous skin test failed to give a positive reaction, even when repeated with tuberculin proved to be active. The subcutaneous injection of tuberculin in increasing doses produced no reaction, whereupon the decision was given against tuberculosis. The medical attendant telephoned a week later to say that the patient had developed a spontaneous pneumothorax which was confirmed by radiological examination; a few weeks later spontaneous pneumothorax occurred also on the other side. And we left them disputing. Which very aptly demonstrates the difficulty of diagnosis and should prevent us from being too critical of the apparent mistakes of others.

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Congresses.

INTERNATIONAL CONGRESS ON MENTAL HYGIENE.

BY OUR SPECIAL CORRESPONDENT.

THE first International Congress on Mental Hygiene was held at Washington, D.C., United States of America, from May 5 to 10, 1930.

Everyone knows what is meant by the term mental hygiene, but few realize how great a part the science of mental hygiene will play in modern medicine. Sir Maurice Craig, President of the British National Council for Mental Hygiene, in his lecture delivered at the Congress, put it thus:

> As I look back over a long professional life, I would that I had always known what I know today about mental hygiene. I have listened to endless academic discussions, and that such are of infinite value no man will deny, but to me as a physician there is something that claims a yet higher place than these and that is the alleviation of mental suffering. Over the centuries physical disease has received much study and research and behind these have stood the figures of great benefactors, but the study of mind and its disorders is yet in its infancy. The few that stand on the threshold of this comparatively new field of medicine already recognize the magnitude of its possibilities. Turn which way you will, you cannot but be impressed by the dominating position that mental matters take in every activity of life. Even physical energy can be squandered and rendered futile unless it is directed by a proper understanding of how to use it.
>
> Mental hygiene has its place, and no insignificant place, in health and disease; it touches upon all activities of life and in consequence it must play a great part in bringing about human happiness.

Growth of the Mental Hygiene Movement.

As a social organization the mental hygiene movement began twenty-two years ago, when Clifford Beers who had recently been discharged from a mental hospital, organized a representative committee, whose chief object was "the improvement of conditions among those actually insane and confined, and the protection of the mental health of the public at large." His book, "A Mind That Found Itself," has made a wide appeal.

In this period of twenty-two years much advance has been made in the treatment of mental disorders in America and elsewhere and in the past ten years similar organizations have been formed in sixty countries, fifty-three of which were represented at the International Congress.

The movement extended from the United States of America to Canada, then to France, Germany, Belgium, Great Britain and elsewhere so that there are now mental hygiene committees in all the continents. The International Congress was organized mainly by the American National Committee and it speaks well for their efforts that they were able to attract representatives of the governments of so many countries. Invitations had been extended by the United States Government to the governments of all countries where mental hygiene organizations existed. The British Government extended the invitation, through the Dominions Office, to the governments of the British Dominions overseas.

Among the delegates who represented Great Britain itself were Sir Maurice Craig, Chairman, and Colonel Lord, Honorary Secretary of the British National Council for Mental Hygiene; Sir Hubert Bond, Commissioner of the Board of Control; Dr. George Robertson, Professor of Psychiatry of the University of Edinburgh; and Miss Evelyn Fox, Honorary Secretary of the Central Association for Mental Welfare.

Canada, India and the Union of South Africa were amongst the British Dominions to send delegates. The Government of the Commonwealth of Australia was represented by Dr. Ralph Noble who also represented the New Zealand National Council for Mental Hygiene, as that body was unable to send delegates.

The objects of the congress may be summarized as follows: (i) To bring together specialists in psychiatry from as many countries as possible, (ii) to compare the methods adopted in these countries in the prevention and treatment of mental disorders, (iii) to invite discussions on scientific papers prepared for the congress, (iv) to establish the International Committee for Mental Hygiene.

Tour of Hospitals and Clinics Prior to Congress.

Prior to the congress a tour had been arranged for the benefit of delegates from other countries. The newly constructed psychiatric and neurological clinics of the New York State which are part of the medical centre associated with the Columbia University Medical School in New York City, were first visited. At these modern clinics and laboratories all types of mental and nervous disease are already treated. Similar clinics are under construction for the Cornell University Medical School in the same city.

The Bloomingdale Hospital at White Plains which is perhaps the most efficient mental hospital in America, was also visited. The opportunities for occupational therapy are particularly well developed here. As far as possible, patients are kept out of the wards during the day and are under the supervision of different persons from time to time, such as the instructors in occupational therapy, the directors of outdoor sports or the workers in the massage and physiotherapy departments.

The child guidance clinics at Newark and New York City were visited and the methods of investigation and treatment of child problems were carefully demonstrated.

The delegates then visited Newhaven, where a new department known as "The Institute of Human Relations" is under construction in connexion with the Yale University Medical School. The unit consists of a new general hospital in proximity to a new medical school with which are incorporated departments of psychiatry and of mental hygiene and child guidance. Closely associated with the medical school are the departments of physiology and anatomy, psychology, anthropology and law. The social sciences will therefore be closely allied to the medical school, allowing the teaching staff to collaborate freely.

The psycho-clinic conducted by Dr. Arnold Gesell is a most interesting department of the Yale Mental Hygiene Organization. In this clinic the study of normal children is being carried out, so that normal development is being scientifically standardized, with a view to early detection of abnormal tendencies in other children. The children under observation live and play in rooms where they are under constant observation, but are unaware of the presence of the observers.

Boston was the next city visited, and here the Harvard University and Medical School were inspected. Visits were also paid to the schools for the feeble minded at Waverley and Wrentham, and also to the Judge Baker Foundation, made famous by the work of its director, Dr. William Healy. The clinical study of delinquent children was demonstrated.

The visitors then proceeded to Philadelphia where another child guidance clinic was seen. At the Pennsylvania Hospital in this city a new psychopathic department containing every modern convenience for the treatment of patients has recently been opened.

One was much impressed by the magnificence of the new hospitals and clinics in the United States and Canada. In Toronto a new private wing has just been completed for the treatment of private patients in connexion with the Toronto General Hospital. The sum of two and a half million dollars was given by public subscription in Toronto for the purpose of building and equipping this unit and the result is a hospital with all the comfort of a first class hotel and the most up-to-date appliances in all branches of medicine and surgery. The achievement not only reflects the prosperity of the country, but also the generosity of its people. A new psychopathic hospital was also built recently adjoining the General Hospital.

The Congress at Washington.

The delegates then assembled at Washington for the congress itself. There could be no more suitable meeting place in America. The stately buildings of the city and the comparative quiet lend much to the atmosphere necessary for a meeting of this kind.

The visiting delegates were received by the President of the United States of America, President Herbert Hoover, at the White House.

The congress was opened at an official dinner at which the United States Government was represented by the Honourable Ray Wilbur, Secretary of the Interior, who addressed the delegates on "Some Aspects of the World Movement for Mental Health." The Minister is a graduate in medicine and showed a complete understanding of his subject. He sounded the keynote of prevention rather than cure. He declared that it was not alone the numbers of people who were brought into custody because of mental states that should concern us, but also the broader principles of the orderly control of man's thinking through education and mental hygiene. Mental hygiene in its widest phases was therefore of international and of world-wide significance. The peoples of the world could well meet together to discuss what has been done and to unite in efforts to solve the greatest of all questions capable of solution—the control of the individual and collective mind of man through the activities of man himself.

At this dinner a representative of each continent spoke in response to the President's toast of the visiting delegates. Dr. Ralph Noble, representing the Government of the Commonwealth of Australia, explained that by means of its purity of race, Australia would avoid many of the social problems which different delegates had shown to be on the increase in other parts of the world, largely through the intermingling of nationalities. For instance, Dr. Emerson, Professor of Public Health of the College of Physicians and Surgeons, New York, had stated that the suicide rate had quadrupled in the United States in the past seventy years and the divorce rate nearly trebled in fifty years. Australia might avoid such trouble if she were able to build up a pure race.

Dr. Kiochi Miyaki, Professor of Psychiatry at Tokyo University, Dr. Gustavo Reidel, Professor of Psychiatry of the University of Rio de Janeiro, Dr. Genil-Perrin, Secretary of the French League for Mental Hygiene, Dr. C. M. Hincks, Medical Director of the Canadian National Committee for Mental Hygiene, and Dr. W. Russell, of the Union of South Africa, also spoke.

President's Address.

The president of the Congress was Dr. William White, Superintendent of Saint Elizabeth's Hospital, Washington, well known by his text books and other writings on mental diseases. In his opening address he sketched the development of the movement in the period of twenty-two years, since it was founded by Clifford Beers. He pointed out that institutions for mental patients, defectives and prisoners had benefited to a great extent by the mental hygiene movement and that the concept of mental illness had been extended beyond the types seen in mental hospitals and included all forms of social maladjustment. He said that they had learned to attack mental disorder at the source rather than treat the end results in institutions. In industry a more happy relation had been effected between the employee and his work. Psychiatry had played a much more important part in the Army and Navy than heretofore, especially in the elimination of unsuitable recruits. It had become largely analytical so that the chains of causation of mental disturbance were better understood. A new psychology had developed in which the emotional tendencies which lay beneath the threshold of consciousness were known to be of even greater importance than those things of which they were clearly aware.

Mental hygiene presented a positive programme for a life well lived, for mental health because of its values and not because of what it avoided.

He concluded by quoting Plato:

> My belief is not that a good body will, of its own excellence, make the soul good; but, on the contrary, that a good soul will, by its excellence, render the body as perfect as it can be.

Congress Programme.

The programme of meetings of the congress was in the hands of Dr. Frankwood E. Williams, Medical Director of the National Council for Mental Hygiene in the United States.

On each morning there were three concurrent sessions for which papers had been prepared and distributed previous to the congress. The author of the paper was allowed to summarize his remarks in ten minutes, after which formal discussion took place. The three sessions concerned mainly: (i) Delinquency and problem cases amongst children, child guidance clinics, and public education in mental hygiene; (ii) university teaching, clinics and treatment facilities in general; (iii) problems in modern psychiatry, such as the effect of alcohol and syphilis in relation to mental health, social welfare, mental hygiene in industry.

The evening meetings were devoted to addresses of general interest given by outstanding leaders in their special fields.

Informal meetings and round table discussions were arranged for those who had mutual interest in specific phases of mental hygiene.

Working committees on special aspects of mental hygiene problems met throughout congress and prepared reports which were presented for official action.

Prior to the congress a considerable amount of material had been collected from all countries so that a survey

of the status of mental hygiene was available and the various committees were in a position to determine the fundamental aims and principles of organized mental hygiene work in various countries, upon which all could agree.

The American Psychiatric Association and the American Association for the Study of the Feeble Minded held their annual meeting in conjunction with the congress, so that interesting material was made available to delegates who were specially interested in the activities covered by these associations.

Social functions were arranged for the afternoons and were availed of as much as possible by the delegates.

A reception was given by the President of the congress at Saint Elizabeth's Mental Hospital, where occupational therapy has been remarkably well developed in a large public institution of over five thousand patients.

During the week "The World View of Mental Hygiene" was presented by a delegate of each of the fifty-two nations represented at the congress delivering a ten minutes' discourse on the mental hygiene of his country. These addresses were well received, interpreters being used when necessary.

The representative of Australia and New Zealand showed that the problems of mental hygiene are very different in the thinly populated countries. The older countries suffered much from the admixture of different civilizations. But Australia contained 90% British people and there was no race problem at all in that country. People who would travel many thousand miles from their homes to a new world were healthy, imaginative and well selected types. Australia had adopted a "White Australia Policy" and the speaker made a plea for the international understanding of Australia's aspirations in this policy. Development of the country from an economic aspect must necessarily be slow, but it was considered that in the end most successful results would be obtained.

The prevention of mental disorder and deficiency was therefore mainly along the lines outlined above. Facilities for the early diagnosis and treatment of nervous disorders were more easily obtained under such conditions. Clinics were being established in conjunction with general hospitals, so that no distinction would be made between the patient with a physical and one with a nervous disorder.

New Zealand presented a somewhat similar picture to that of Australia except that there was a strong native Maori population in New Zealand, very different from that of the aboriginal in Australia. Mental hygiene would therefore be of importance to the native population of New Zealand, whereas it was of no account to the native of Australia.

The New Zealand National Council for Mental Hygiene was inaugurated on February 20, 1929. Three years prior to this date the Medical Faculty of the University of Otago had approved of the formation of a National Council for Mental Hygiene and the Psychiatry Section of the Second Session of the Australasian Medical Congress (British Medical Association), held in Dunedin two years previously, had also endorsed the proposal.

Formation of the International Committee for Mental Hygiene.

On May 6, 1930, the International Committee for Mental Hygiene was formed at a meeting of the congress. This international committee exists for the following purposes: To engage exclusively in charitable, educational, literary and scientific activities, with particular reference to the study, care and prevention of nervous and mental disorders and of mental defect. As means to the foregoing end:

1. To encourage and promote in every country the establishment of a duly authorized voluntary national society for mental hygiene for the conservation of mental health, the reduction and prevention of nervous and mental disorders and mental defect, the scientific and humane care and treatment of those suffering from any of these disorders, the acquisition and dissemination of reliable information on all phases of the subjects mentioned and on mental factors involved in such subjects as education, industry, unemployment, delinquency, crime, dependency, prostitution, drug addiction and other subjects within the broad field of human behaviour.

To serve as a coordinating agency for mental hygiene work and to cooperate with all agencies, governmental and private, and with individuals engaged in any phase of such work.

Its original members are drawn from the fifty three countries which were represented at the congress, and the following officers were elected at the inaugural meeting:

President: Dr. Arthur H. Ruggles, Chairman of the American National Committee for Mental Hygiene.

Vice-Presidents: Sir Maurice Craig, Chairman of the National Council for Mental Hygiene of Great Britain; Dr. C. M. Hincks, Medical Director of The Canadian National Committee for Mental Hygiene; Dr. Robert Sommer, President of the German Association for Mental Hygiene; Dr. C. C. Ferrari, President of the Italian League for Mental Hygiene; and Dr. Genil-Perrin, Secretary of the French League for Mental Hygiene.

Mr. Clifford W. Beers was appointed General Secretary.

Honorary Presidents were elected, to represent the six continents: Dr. J. T. Dunstan (Africa), Dr. Kiochi Miyaki (Asia), Dr. Ralph A. Noble (Australasia), Dr. Edouard Toulouse (Europe), Dr. William H. Welch (North America), and Dr. Gustave Reidel (South America).

The Governing Board will consist of representatives of all national committees on mental hygiene which are approved by the International Committee and the delegates will be nominated by the individual councils.

Reports of Subcommittees.

During the congress eight subcommittees were appointed as follows: Committee on Statistics, Committee on Institutions, Committee on Legal Measures and Laws, Committee on Psychiatric Work in Prisons and among Delinquents, Committee on Dependency, Committee on Psychiatric Social Work, Committee on Industry and Mental Hygiene, Committee on Clinics. These committees met regularly and drew up reports and recommendations for ratification by the newly formed International Committee.

The Committee on Psychiatric Work in Prisons and among Delinquents recommended that a mental examination of accused persons should be made before trial and that the machinery of the courts should become adapted to securing adequate psychiatric reports upon prisoners. This committee also recommended that in addition to mental examination before trial, a psychiatric study of all prisoners submitted to penal and corrective institutions should be carried out as an aid to their classification, occupation, discipline and final release. Also that all juvenile offenders should be dealt with by separate courts, the purpose of which should be corrective rather than punitive, equipped with an adequate probation service, and that all such offenders should be submitted to psychiatric study before final disposition of their case was made.

The Committee on Clinics recommended that the outpatient clinic attached to general hospitals should be developed as far as possible and that separate departments should be formed for adults and children. Each clinic should contain on its staff a psychiatrist in charge, social workers with psychiatric training, a psychologist and such other professionally trained personnel as the conditions indicated. They recommended that special attention be given to the mental hygiene of students in schools, colleges and universities, so that an adequate programme would be developed in these institutions, not only to meet the mental hygiene problems of the individual students, but also to provide all students with some knowledge of mental hygiene.

Mental Hygiene among College and University Students.

The President of the International Committee, Dr. Arthur H. Ruggles, described the work of mental hygiene in colleges and universities. He said that mental hygiene organizations had existed in some American and Canadian colleges for about ten years. The reason for the formation of such organizations was the fact that such a relatively large number of men and women had broken down during their college course or soon afterwards and also many of those who had received a university education, were

later able to do very little with it. Mental hygiene in the college did not mean the search for mental disease or disorder. It meant the search for increasing efficiency and therefore increasing happiness for the students. It was found that the conditions met with in students who required treatment, arose from various factors such as: (i) The competitive side of the educational programme; (ii) the adjustment necessary in changing from a small institution, where the student had been a leader, to a large university where at first he became lost; (iii) anxiety states arising from separation from home or because of financial insecurity; (iv) the depression that comes with certain of the adolescent physiological changes. Cases arising from this source were rather more frequent than had previously been realized.

Dr. Ruggles pointed out that it would seem to be a much more constructive policy to search for the causes of failures rather than to deal with them from a disciplinary point of view; adding disgrace to a pathological depression created a very serious situation. He stated that college men and women had welcomed mental hygiene services gladly and they cooperated very freely with the mental hygiene clinics. As the result of introducing mental hygiene at Yale University it had now become a popular course for study by many undergraduates. Many students were acquiring the knowledge that the emotions as well as intellect played a very important part in life and that certain qualities of personality were necessary for leadership. Mental hygiene would therefore do much to develop real leaders in the social order.

Concluding Session of Congress.

The congress concluded with an official luncheon on May 10, at which delegates from each of the continents gave their impressions of the conference itself and the possibilities for the future.

Dr. Ralph Noble, in speaking for Australasia, made an appeal to the stronger and more financial nations to assist the younger countries in the training of psychiatrists and social workers by offering fellowships to suitable persons to enable them to obtain training in America, Great Britain and the Continent of Europe. He said:

> Mental hygiene promises to be the greatest field of preventive medicine. It is a biological and social science which has already extended beyond the fields of psychiatry and the abnormal, and is now devoting its main attention to the normal, in order to prevent maladjustments rather than treat their results. It is, therefore, of great importance that the younger countries of the world should study the problems of older civilizations in order that steps can be taken early to prevent rather than cure. The formation of The International Committee for Mental Hygiene at Washington represents a great step in world progress for, besides providing the opportunity for countries with similar problems to improve their methods of attack, it will help the younger nations to discover the best principles for the attainment of health and happiness in the newer civilizations of the world.

Impressions of the Congress.

All delegates were greatly impressed by the extent of the American enthusiasm for mental hygiene and the development of the organization of the American National Council. The subject seems to have a strong emotional appeal to Americans and in addition they certainly understand the importance of prevention rather than cure.

Secondly, the progress of the movement in other countries is also considerable, especially in Canada. This was perhaps due largely to the proximity to America and the fact that the same or similar educational systems exist in the two countries. The mental hygiene work in Toronto is based upon scientific lines, inquiry being made especially into normal and abnormal tendencies in children. Normal children are under observation in order that abnormal tendencies in others can be detected at an early stage by contrasting them with normal types. The cooperation of parents is secured early; and indeed many of the problems which present themselves when difficult children are referred to the clinics for treatment, show that the parents themselves are the cause of many disorders amongst children and that they also are in need of and receive treatment.

The delegates from the Continent of Europe showed keen interest in the subject and the movement has evidently led to a much greater interest in psychiatry and mental hygiene in European universities. Also the State services have gained much benefit. Dr. Frede, of the Department of Justice, Thuringia, has outlined a new educational system of penal administration in Germany which aims at the training of the offenders to become useful and law-abiding members of society by means of suitable work, education and treatment in institutions.

The Future of the International Movement.

There is no doubt that such a movement has great possibilities for the future and will do much to emphasize the preventive aspect of psychiatry and the study of human personality.

It is important that the movement should be controlled by experts with scientific knowledge of the problems concerned. The laymen associated with the leadership of the movement disclaim all knowledge of mental hygiene and are content to leave the questions of method and policy to trained experts. If the movement is continued upon these lines, it will certainly become an important institution in all countries.

The Governing Board of the International Committee contains delegates from all countries possessing mental hygiene organizations, but for the present the majority of members of the Executive Committee are drawn from the United States of America, Canada, Great Britain and the Continent of Europe, in order that this committee can make arrangements for the next International Congress which will take place in Paris in about three years' time.

British Medical Association News.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been nominated for election as members of the New South Wales Branch of the British Medical Association:

Windeyer, Richard Michael, M.R.C.S. (England), 1925, L.R.C.P. (London), 1925, M.B., Ch.B., 1930 (Univ. Cambridge), 2A, Besborough Avenue, Bexley.

Williams, Patrick Michael, M.B., Ch.M., 1923 (Univ. Sydney), 7, Cecil Edward Street, Bondi.

The undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Gunther, Carl Ernest Mitchelmore, M.B., 1930 (Univ. Sydney), Royal South Sydney Hospital, Zetland.

Clements, Frederick William Arthur, M.B., B.S., 1928 (Univ. Sydney), 114, Leichhardt Street, Waverley.

Obituary.

ALEXANDER KRAKOWSKY.

THE news of the death of Dr. Alexander Krakowsky which occurred in London on June 18, 1930, will be received with regret by his many friends in various parts of the world and particularly in South Australia.

Alexander Krakowsky was born in Kronstadt and early in life he was exiled to Siberia for political offences in which he showed his sympathy for the peasants whose sufferings he had witnessed. After a time he returned to St. Petersburg and continued his medical studies. Later he settled in South Africa and practised at Johannesburg, and at the outbreak of the Boer War he offered his services to the British Government and was attached with the rank of Captain to the 12th Lancers, stationed in Paarl, Cape Colony. He was subsequently transferred to the Australian

troops. For his services in the war he was awarded both Queen Victoria and King Edward decorations. At the termination of hostilities he remained in Paarl, being appointed District Surgeon and Medical Officer of Health. After some years he relinquished his appointment and private practice to study further, and went to Berlin for post-graduate work. He was always interested in gynæcology and he now began to specialize in this branch of medical work.

Before going to Australia he was in the Far East, being attached to the British Embassy, and eventually accepted the appointment as Medical Officer to the British Consulate in Dairen, in Southern Manchuria. At the outbreak of the Great War he was in Shanghai, where he rendered valuable services to the French Government, to whom he was "lent" by the British Government. He was attached to the Sixteenth French Colonial Regiment and did not spare himself. For his services he was awarded the *Médaille d'Honneur* by the French Government.

His ill health was responsible for his having to leave the East, so with his wife he went to Australia and practised for a time in Renmark, South Australia. Later he moved to Adelaide, where he made a large circle of friends. He became a prominent member of the Naval and Military Club and of the South African Soldiers' Association, of which he was a Vice-President. He also took great interest in all forms of work in the city. About a year ago he was advised to take a trip to Europe for his health and he was there under the capable care of Professor Camille Lion of Paris. In spite of his ill health he spent much time in medical study and visited various Paris hospitals.

He died very suddenly at the French Military and Naval Club in Paris, of which he had been made a life member in recognition of his services to France during the Great War. He is survived by his wife who is the daughter of the late Matthew Goode, of Adelaide, and their daughter, Olga Elizabeth, who was born in Adelaide in October, 1916, and by four other married daughters living in London. His son is a member of the medical profession and practises in London.

Alexander Krakowsky experienced many difficulties throughout his life; he surmounted them by his personal charm, ability and determination. He endeared himself to all those who had the privilege of knowing him intimately.

ALFRED HENRY BENNETT.

DR. ALFRED HENRY BENNETT whose death at Adelaide on August 9, 1930, was recorded in a recent issue, was born at Moonta, South Australia, on October 10, 1867. He was the son of the late Nicholas Dunstan Bennett, sometime clerk of the local Court at Moonta. He entered upon the study of medicine in 1884 at the University of Aberdeen and was admitted to the degrees of Bachelor of Medicine and Master of Surgery. He took a lively interest in all things pertaining to student life and was President of the Students' Union at Aberdeen. He came to Australia and started practice at Kapunda, where he remained for two years. He then spent twelve years at Crystal Brook and decided to specialize. After devoting eighteen months to the study of ophthalmology and diseases of the ear, nose and throat in London and Vienna, he took up specialist practice in these subjects in Adelaide. His clinical knowledge and his knowledge of men stood him in good stead and he soon became successful. During the war he rendered useful service at the Keswick Soldiers' Hospital.

Alfred Henry Bennett was a popular man and a sportsman. For many years he was prominent as a race horse owner and breeder. He was on the Committee of the Adelaide Racing Club. At the meeting of the Club on August 16, 1930, flags on the course were flown at half mast and the jockeys in the Grand National Hurdle Race wore black armlets as a tribute of respect to his memory. He was a most enthusiastic gardiner and his large estate at Manningham was always noted for its flowers, fruit and vegetables. By his will he left a large block of land to the Government as a children's playground and provided for its maintenance. He also instructed his executors to build a number of cottages for free use by professional men or their dependants who had fallen on evil times. This was the natural result of his generous nature and his love for his fellows; some of his less fortunate brethren will doubtless think of him with gratitude in their declining days. His example might well be followed by others.

Special Correspondence.

LONDON LETTER.

BY OUR SPECIAL CORRESPONDENT.

Hospital Patients.

THE question of the provision of paying wards for "middle-class" patients in the voluntary hospitals has once more arisen. It might be mentioned in passing that, as a matter of fact, all patients in hospitals are expected to contribute according to their means, and the amount is decided by specially trained almoners to whom is delegated the work of inquiring into the income, responsibilities *et cetera* of the prospective patient and settling the amount that he can reasonably be asked to provide towards the cost of maintenance. The average cost per week of a patient in a large general hospital is stated to be about four pounds. It should be borne in mind that destitute patients come under the Poor Laws and are dealt with in the rate-supported infirmaries controlled by the Local Government Board and not in the voluntary hospitals.

With few exceptions, workers in England, whether manual or brain, whose earned income is under £250 *per annum*, are compelled to pay a weekly contribution to the National Health Insurance Fund and if a worker, having been for a stated period a member of an approved friendly society under this scheme, becomes an in-patient at a voluntary hospital, the hospital authorities may claim an allowance from the approved society which varies according to the circumstances, but averages about two pounds per week. The work of obtaining this payment is left to the hospital almoner who, in addition, claims from the patient himself such contribution as it is considered that his income warrants. There are in existence various voluntary insurance associations for helping patients of this class to which people whose income is under the hospital limit (generally £250 *per annum* for single persons) may subscribe and which in return undertake the payment of hospital fees under certain conditions.

To return now to schemes for dealing with what are called "paying patients" as distinct from the usual class of patients admitted to voluntary hospital, one might define the term "paying patient" as used at present as indicating that class of the public which does not come under the National Health Insurance scheme, but which cannot be classified as "wealthy" and therefore able to pay the usually heavy charges for nursing homes in addition to full fees for medical or surgical treatment. It has been realized for a long time that this middle class is an enormous one for whom no adequate provision has as yet been made, though there are signs that the problem is receiving attention. Certain of the big hospitals have allocated beds for the reception of "paying patients," the charge per week being six to eight or even ten guineas *plus* additional fees for any extra nursing, massage, X ray treatment, electrical treatment *et cetera*, use of operating theatre, anæsthetist's fee and so forth. The fees to the physicians or surgeons are a matter of arrangement between the patient and his doctor and are quite apart from the hospital charges. It is obvious that only the highest incomed members of the "middle" class can take advantage of a scheme of this nature and that for those with small incomes it is as impossible of attainment as the nursing homes *et cetera* of the wealthy class.

Patients of this class, of course, are not eligible for membership of the majority of the voluntary insurance

associations mentioned before, as, though their incomes may be small, they are above the hospital income limit. It is of great interest, therefore, to read of a new and so far highly successful scheme which has been instituted by the Norfolk and Norwich Hospital, at Norwich in the County of Norfolk. This Hospital Treatment Insurance scheme is intended only for the real "middle class" patients and the income limit (£350 *per annum* for single persons up to £550 *per annum* for married persons with children under sixteen years old) is fixed far higher than is the case in any other scheme at present in existence. The annual premium to be paid is 30s. which may be paid yearly, half-yearly or quarterly in advance, and the member is eligible six months after payment of the first premium. The premium covers all medical and surgical nursing and maintenance costs as an in-patient up to four weeks and the patient is under the care of a member of the visiting medical staff. Special out-patient treatment is also provided under certain conditions for the same premium, consisting of X ray examinations and treatment, massage, electrical and light treatment, pathological examinations and treatment. The first charge upon the insurance fund is four guineas per week per patient for the hospital funds and an equivalent amount up to a maximum of fifteen guineas for the member of the staff concerned. The profits of the insurance scheme (and it is interesting to learn that there are profits) are retained by the hospital until all initial capital expenditure in connexion with the home has been cleared.

From the patient's point of view this is undoubtedly an excellent scheme and it appears that in operation it has proved no less successful as regards the hospital finances and the medical staff. It is to be hoped that other hospitals will follow the lead of the Norfolk and Norwich Hospital in making such valuable and badly-needed provision for the unhappy "middle" classes.

It seems inevitable that schemes of this nature will become more and more numerous; in fact it is obviously the only method of dealing with the problem of illness amongst members of the middle class; and the next point, therefore, which arises in this connexion is the question of the place of the private practitioner. So far, in any schemes dealing with "paying patients," it has been laid down that they may only be treated by a member of the staff of the hospital which they enter, but it has been pointed out that there are numbers of doctors who have not been able to obtain positions on the staffs of the hospital for various reasons totally unconnected with their ability and skill, and who are dependent upon the private family practice which they have built up by unremitting hard work. Under insurance schemes which lay down the regulation that only members of the staff of the hospital concerned may attend patients within its walls, it is obvious that these general practitioners will suffer heavily, and it is to be hoped that the scope of future schemes will be broadened to permit of some *modus vivendi* being arrived at which will prove fair and satisfactory to all concerned.

Correspondence.

WORKERS' COMPENSATION INSURANCE PRACTICE.

SIR: I was pleased to read that "Orthopæde" in your issue of August 16 had brought up the matter of the medical referee in connexion with Workers' Compensation insurance practice. Ever since the act came into force this question has cried aloud for attention.

In our old sporting days we all placed the referee on a pedestal; his opinion was final and we accepted it. He was in a position to see every point of the game and acted fairly for both sides. In this new sport of Workers' Compensation insurance I do not claim to be well up in the rules, but I take it the referee understands that the insurance company, the worker and the medical attendant are all taking part in the game. "Orthopæde" gives his experience, so I shall quote one of mine.

On rendering my account to an insurance company, I was asked by the company why I attended the worker so many times. I replied that I considered the patient's condition required the attendances given. The company then placed the matter of attendances before its referee. On request I state the case fully and give medical reasons for attendance to the referee who decides that the company shall not pay for the number given.

In this case the referee has never seen the patient or the medical attendant, but decided that the latter is not playing according to the rules, and his judgement is final.

Is it too late to wish that we might return to the old sporting days, or have we mislaid the old rules?

Yours, etc.,

A. J. CORFE.

Glen Innes,
New South Wales.
August 16, 1930.

DIAGNOSIS OF RENAL TUBERCULOSIS.

SIR: In the interesting and instructive article on the above subject which appeared in THE MEDICAL JOURNAL OF AUSTRALIA of August 16, 1930, there are two statements that call for comment.

On page 240 it is stated that "the urine, on microscopical examination, will be found to have none of the usual pus producing organisms, nor can any be grown from it on culture." It is not unusual for pus-producing organisms, especially the *Bacillus coli* and occasionally a staphylococcus or streptococcus, secondarily to infect a kidney previously damaged by the tubercle bacillus.

Dr. Reginald Bridge states the finding in the urine of the tubercle bacillus of Koch accompanied by pus cells is the only absolute and unequivocal sign of renal tuberculosis, a condition which he goes on to describe as a "simple clinical exercise in bacteriology." The technique advocated to exclude contamination with the smegma bacillus is to sponge thoroughly the meatus and *fossa navicularis* and then the urine is passed into a vessel with the prepuce drawn back. The following case demonstrates the possible imperfections of this technique.

A man, aged sixty-one years, after having been successfully treated for a minor ailment requested an examination of his urine, because fifteen months previously he had been confined to bed for one month suffering from "inflammation of the right kidney" and was anxious to know if the renal lesion was cured. In all, eight specimens were examined by the Ziehl-Neelsen method by three independent pathologists.

The specimens on April 19 and April 23 were secured by the writer, the *meatus urinarius* being cleansed with alcohol. The other six specimens were obtained by the different individual pathologists, who will be designated Drs. X, Y and Z.

The patient refused cystoscopic examination.

1. Dr. X (April 19, 1929).—Urine: Specific gravity 1010, albumin present, no sugar, numerous pus cells, few granular casts, a few epithelial cells, large number of bacteria (? B.C.C.). Stained film: There are present acid and alcohol fast bacilli which must be looked upon as tubercle bacilli.

II. Dr. Y (April 23, 1929).—Many pus cells, numerous bacilli present, probably B.C.C. No tubercle bacilli were detected.

III. Dr. X (April 30, 1929).—Four specimens of urine were examined. On two occasions, when a good deal of pus was found, tubercle bacilli were seen (acid-alcohol fast). B.C.C. were cultivated from catheter specimen of April 24, 1929.

IV. Dr. Z (April 30, 1929).—Specimen freshly passed, centrifugalized and films made from deposit and stained. "Ziehl-Neelsen," no acid fast bacilli found. Stained films show fair number of pus cells, few squamous epithelial cells, many clumps of dead bacilli present. Very few motile bacilli.

V. Dr. Z (May 1, 1929).—Specimen collected first thing in morning. Specimen centrifugalized and films made and stained. "Ziehl-Neelsen," no acid fast bacilli found. Stained films show numerous pus cells, numerous bacteria present, probably *Bacillus coli*. Some of deposit was inoculated into a guinea-pig.

VI. Dr. Z (July 30, 1929).—Guinea-pig killed and shows no evidence of tuberculosis.

The patient is at present in another State and is being subjected to investigation in connexion with "rheumatism" and except for the loss of a few pounds in weight consequent upon being rendered edentulous, states that he feels quite well and has had no return of urinary symptoms.

The symptoms of renal tuberculosis may intermit and become latent in a most remarkable manner, so time alone will solve the diagnosis in this case.

In cases of suspected renal tuberculosis, more especially where the patient may be unwilling to submit to cystoscopy, the writer now subscribes to the doctrine of equality of the sexes and obtains catheter specimens from both male and female patients. Over a quarter of a century ago Young pointed out that the smegma bacillus lived on the *glans penis* and prepuce and also on the surface of the penile urethra in the first few inches of its course.

It would therefore appear that the most reliable method in the male for excluding contamination with the smegma bacillus is catheterization subsequent to anterior urethral irrigation.

Yours, etc.,

H. RUTHERFORD DARLING.

Sydney.
August 20, 1930.

CHRONIC POISONING WITH CARBON MONOXIDE.

SIR: Some six weeks ago I noticed pallor and malaise in a member of my family and about the same time experienced disturbed sleep and severe headache in the small hours of morning. Both conditions have cleared up since turning off the gas at the meter after supper.

In *The British Medical Journal* received today (page 17 of issue dated July 5) Sir Bernard Spilsbury describes a similar state of things as occurring in the family of a doctor friend of his.

I suggest that in our search for sources of chronic debility it is well to think of small gas leaks often found about ill-fitting taps of stoves and bath heaters.

Yours, etc.,

K. ST. VINCENT WELCH.

Wollstonecraft.
August 12, 1930.

BRONCHIECTASIS.

SIR: May I offer my congratulations on the excellent articles on diagnosis which you are providing weekly in your journal. They will without doubt be of great value, particularly to the general practitioner.

Without wishing to be a carping critic, I would still like to draw your attention to the fact that of the eight articles appearing up to the present date, not one has been contributed by a general physician. It would seem that the mere physician is to be trusted to diagnose very little.

One was not altogether surprised to see a surgeon diagnosing exophthalmic goitre, though this is open to criticism. No doubt also in the future we must expect to see abdominal disease reserved exclusively for the surgeons. But surely it must come as a surprise to physicians to find that diseases of the chest are even to be taken from us.

Since when has bronchiectasis been the province of the oto-rhino-laryngologist? Chronic suppuration in the upper respiratory tract, we may agree, is an important ætiological factor, and the "prebronchiectatic stage," as Dr. Graham Brown terms it, is within the scope of the rhinologist, but I feel compelled to enter an emphatic protest against THE MEDICAL JOURNAL OF AUSTRALIA tacitly assuming that bronchiectasis is a disease to be diagnosed by our ear, nose and throat colleagues.

Dr. Graham Brown's article is admirable, but that he should offer a differential diagnosis, including pulmonary tuberculosis and chronic bronchitis, is surely trembling on the verge of presumption.

I submit that it would be very serious if the general practitioner were advised to send his doubtful chest cases to the ear, nose and throat surgeon for diagnosis. It cannot be doubted that this article is open to that interpretation.

Yours, etc.,

"PHYSICIAN."

Sydney.
August 23, 1930.

["Physician's" letter is welcome. It gives an opportunity for laying emphasis on the "prebronchiectatic stage." This is the stage in which diagnosis should be made. It was with this object that a rhinologist was asked to contribute the article. The assumption is that the "prebronchiectatic stage," not the fully developed bronchiectasis, is to be diagnosed—and not only by oto-rhino-laryngologists, but also by the general practitioner. In "Utopia" there will be very little bronchiectasis.—EDITOR.]

BIOLOGICAL CHEMISTRY FOR STUDENTS.

SIR: The criticism of our "Elementary Practical Biochemistry" in your issue of August 16 is obviously made by one conversant with the subject and is therefore of value.

May we point out that misunderstanding is likely to arise unless it is realized that Dr. Ivan Maxwell's "Clinical Biochemistry" is a companion volume.

Omissions charged to our account are deliberate and students are introduced to principles which are elaborated in detail in the clinical course.

Whether salts really enter into practical consideration of diet is a matter of opinion, and to describe as "irrelevant" the item of cost of food in these times of depression, when the public needs instruction in the purchase of nutriment, is certainly curious.

As regards the chapter on "colloids," where "quite an advanced knowledge . . . is taken for granted," it must be remembered that the book is designed primarily for Melbourne students who come to their classes in biochemistry adequately prepared in this subject.

Yours, etc.,

W. A. OSBORNE.
W. J. YOUNG.

Melbourne.
August 19, 1930.

MODERN VIEWS ON SOME OBSTETRICAL AND GYNÆCOLOGICAL PROBLEMS.

SIR: Kindly allow me to reply to the criticisms by Drs. Porter and Fowler of my letter published in THE MEDICAL JOURNAL OF AUSTRALIA of July 12, 1930.

Dr. Porter quotes University College Hospital, London, as to the successful treatment of non-malignant uterine conditions by radium. Let me quote from the work of the same institution.

In *The British Medical Journal* of August 5, 1929, page 219, is a report by Hacker-Smith, Registrar of University College Hospital, on local after-effects of radium treatment. Firstly, in "treatment of non-malignant conditions": The after-effects recorded are:

1. Burn of the vagina.
2. Atrophy of the whole of the vaginal portion of the cervix.

3. Vaginitis, both purulent and adhesive and associated with profuse discharge.

4. Shortening and stenosis of the vagina. Similar constriction of the vagina.

5. Ovarian neuralgia.

6. Adhesions between anterior and posterior vaginal walls.

7. Where shortening and stenosis have developed, the examining finger could be admitted for about one inch only. In cases of malignant disease analysis of the after-effects of radium is complicated by the fact that it is impossible to differentiate between the normal ravages of the disease itself and the lesions produced by the treatment. In previous reports the following conditions have been recorded:

8. Persistent pyrexia.
9. Pyometra.
10. Pelvic abscess.
11. Pelvic peritonitis.
12. Fistulation.
13. Dissemination of the growth.

Readers will please note that all these dire effects following treatment by radium are officially reported from the radium clinic of one of the chief hospitals of the world. That this experience is not singular can be seen in the journals almost every week. The report of the Marie Curie Clinic, London, published in *The British Medical Journal*, November 30, 1929, page 1025, says: "Of all the patients treated by the Stockholm method, 7% develop late radium reactions."

In *The British Medical Journal* of November 19, 1927, page 938, is a report of a meeting of the North of England Obstetrical and Gynæcological Society. Mr. King, of Sheffield, showed:

> A uterus removed for cancer four years after he had applied radium for menopausal bleeding due to a fibroid. It had been noted at that time that the cervix was healthy. The specimen showed a squamous-celled carcinoma of the cervix. The cavity of the uterus was practically obliterated. The fibroid at the fundus still present, compact and cellular. The ovaries showed no ova at the cortex.

A most instructive case and in the highest degree condemnatory of radium treatment for myoma, the ovarian function destroyed, the myoma still present and cancer of the cervix developed.

At the same meeting Dr. Leith Tapier showed a uterus and ovaries removed for a persistent pain and hæmorrhage for which radium had been used four months previously. The ovary was without definitely normal ova.

In a letter which Dr. Fenwick, of New Zealand, contributed to *The British Medical Journal* of March 9, 1929, page 473, he expressed the view that the success of the treatment by radium of the uterine hæmorrhage of middle life was due "to the action of the gamma rays upon the ovarian tissue, causing a practical spaying . . . . These patients experienced hot flushes, sweatings, headaches and other menopausal symptoms."

In the epitome of *The British Medical Journal* for May 10, 1930, page 81, I. L. Faure, one of the greatest surgeons in Europe, records four cases in which radium applied for fibroids led to increase in size of tumours of the ovaries. "The diseased cells are not destroyed; they are stimulated . . . . In certain cases benign epithelial ovarian tumours may become malignant" (by use of radium).

In *The British Medical Journal* of November 19, 1927, page 921, Professor Fletcher Shaw, of Manchester, for whom we all have a great respect, reports a case of radium burns with great uterine tenderness. He says:

> I give it as my considered opinion that it is much safer for a woman with a fibroid to have it removed before the menopause than to run the risk of degenerative changes which so frequently occur after the menopause.

Later on he says:

> A fibroid uterus was much more likely to undergo malignant changes than a non-fibroid uterus.

I have made no search throughout the literature; the above is but a moiety of the evidence which can be produced to prove that in the treatment of non-malignant conditions of the uterus radium is, as compared with surgery, at least as dangerous, far more likely to be incapacitating, far more uncertain, far less health promoting, because it leaves untouched the focal sepsis in the cervix and, finally, does not exclude the occurrence of cancer which, indeed, is favoured by the constant irritation arising from the cystic degeneration of the cervix so commonly present in chronic metritis and "the bleeding uterus" of the menopause.

I appeal to surgeons and practitioners to compare, wherever opportunity offers, the condition of women who have had total hysterectomy done for fibroids or chronic metritis with those in whom the same diseases have been treated by radium. The treatment of cancer is an entirely different proposition. Here I am not satisfied with what surgery, marvellous as have been its results, can do. While Wertheim's operation has given me some of my most gratifying triumphs, it has also resulted in poignant disappointment. I believe there is no surgeon who would not gladly surrender the surgery of malignant disease, if he were convinced that by radium or other agent he could obtain better results than surgery offers. Unfortunately there is no proof that radium is that agent; while Heyman, of Stockholm, has reached results equal to those of surgery, no British surgeon, although strictly following his technique, has been able to attain similar success. Moreover, even Heyman cannot show the ten and twenty year survivals which surgeons, including myself, can bring forward.

My quotation in my previous letter of Victor Bonney's results was from the Hunterian lecture by him before the College of Surgeons on January 27, 1930, reported in *The Lancet*, February 8, 1930, page 277. The operability rate was 63%, the operative mortality 16·5%, relative cure 38·7%, absolute cure 24·4%. In his better conditioned private patients the absolute cure rate was 37·5% and the relative 48%.

The gland involvement rate was 43%. As there is no means of ascertaining before operation when glands are involved, this 43% of patients, if they had been treated by radium, would have lost the chance which surgery could have given.

The vital importance of and general interest in this subject will, I trust, excuse my occupying so much space in our journal.

Yours, etc.,

RALPH WORRALL.

233, Macquarie Street,
Sydney.

August 25, 1930.

Proceedings of the Australian Medical Boards.

VICTORIA.

THE undermentioned have been registered under the provisions of the *Medical Act*, 1928, of Victoria, as duly qualified medical practitioners:

Ferguson, John Bell, M.D., 1928 (Edinburgh), M.R.C.P., 1927 (London), Public Health Department, Queen Street, Melbourne, C.1.

Jones, Brynmor Beveridge, M.B., B.S., 1921 (Univ. Adelaide), 17, Cliff Street, Essendon, W.5.

Van der Hoope, Izso Hartmayer, M.D., Ch.D., 1926 (Univ. Siena), 6, Canning Street, Carlton, N.3.

Bianchi, Pietro, M.D., Ch.D., 1926 (Univ. Genova), 154, Nicholson Street, Fitzroy, N.6.

Santoro, Soccorso, M.D., Ch.D., 1926 (Univ. Genova), 154, Nicholson Street, Fitzroy, N.6.

Additional diploma registered:

Adey, Charles William, M.D., 1922 (Univ. Melbourne).

TASMANIA.

The undermentioned have been registered under the provisions of the *Medical Act*, 1918, as duly qualified medical practitioners:

Drew, John Frederick Francis, M.B., B.S., 1930 (Univ. Melbourne), Campbell Town.
Davis, Ethel Eva, M.B., B.S., 1929 (Univ. Melbourne), Hobart General Hospital.
Solomon, George Herbert, M.B., B.S. (Univ. Adelaide), Hobart General Hospital.
Willis, Henry Hastings, M.B., Ch.M., 1914 (Univ. Sydney), Repatriation Department, Hobart.

Books Received.

A SYSTEM OF CLINICAL MEDICINE, DEALING WITH THE DIAGNOSIS, PROGNOSIS AND TREATMENT OF DISEASE, FOR STUDENTS AND PRACTITIONERS, by Thomas Dixon Savill, M.D.; Eighth Edition; 1930. London: Edward Arnold and Company. Royal 8vo., pp. 1047, with illustrations. Price: 28s. net.

ON FAITH AND SCIENCE IN SURGERY, by Sir John Bland-Sutton, Bt.; 1930. London: William Heinemann (Medical Books) Limited. Demy 8vo., pp. 121, with illustrations. Price: 7s. 6d. net.

GENERAL PRACTICE (SOME FURTHER EXPERIENCES), by Ernest Ward, M.D., F.R.C.S.; 1930. London: John Bale, Sons and Danielsson, Limited. Crown 8vo., pp. 108. Price: 3s. 6d. net.

ACTA LEIDENSIA EDITA CURA ET SUMPTIBUS SCHOLAE MEDICINAE TROPICAE: Volume IV; 1929. Crown 4to., pp. 212, with illustrations.

CANCER OF THE LARYNX, by Sir St. Clair Thomson, M.D., F.R.C.S., F.R.C.P., and Lionel Colledge, M.B., F.R.C.S.; 1930. London: Kegan Paul, Trench, Trubner and Company Limited. Demy 8vo., pp. 266, with illustrations. Price: 25s. net.

DIETETICS AND NUTRITION, by Maude A. Perry, B.S.; 1930. St. Louis: The C. V. Mosby Company; Melbourne: W. Ramsay. Demy 8vo., pp. 332. Price: $2.50 net.

PERSONAL AND COMMUNITY HEALTH, by Clair Elsmere Turner, M.A., Dr.P.H.; Third Edition; 1930. St. Louis: The C. V. Mosby Company; Melbourne: W. Ramsay. Demy 8vo., pp. 443, with illustrations.

Diary for the Month.

SEPT. 9.—New South Wales Branch, B.M.A.: Ethics Committee.
SEPT. 10.—New South Wales Branch, B.M.A.: Last day for nomination of two candidates for election to Federal Committee.
SEPT. 11.—New South Wales Branch, B.M.A.: Clinical Meeting.
SEPT. 11.—Victorian Branch, B.M.A.: Council.
SEPT. 11.—Queensland Branch, B.M.A.: Surgical Section.
SEPT. 12.—Queensland Branch, B.M.A.: Council.
SEPT. 16.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
SEPT. 17.—New South Wales Branch, B.M.A.: Section of Obstetrics and Gynæcology.
SEPT. 17.—Queensland Branch, B.M.A.: Eye, Ear, Nose and Throat Section.
SEPT. 23.—New South Wales Branch, B.M.A.: Medical Politics Committee.
SEPT. 24.—Victorian Branch, B.M.A.: Council.
SEPT. 25.—South Australian Branch, B.M.A.: Branch.
SEPT. 25.—New South Wales Branch, B.M.A.: Branch.
SEPT. 26.—Queensland Branch, B.M.A.: Council.
OCT. 1.—Victorian Branch, B.M.A.: Branch.
OCT. 2.—Federal Committee of the B.M.A. in Australia.
OCT. 2.—Queensland Branch, B.M.A.: Council.
OCT. 3.—New South Wales Branch, B.M.A.: Annual Meeting of Delegates of Local Associations with the Council.
OCT. 3.—Queensland Branch, B.M.A.: Branch.

Medical Appointments.

Dr. D. H. K. Lee (B.M.A.) has been appointed Government Medical Officer in accordance with the provisions of Section 3 of *The Miner's Phthisis Act*, 1922, Western Australia, from July 28, 1930.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company, Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Mount Isa Hospital. Boonah Hospital.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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